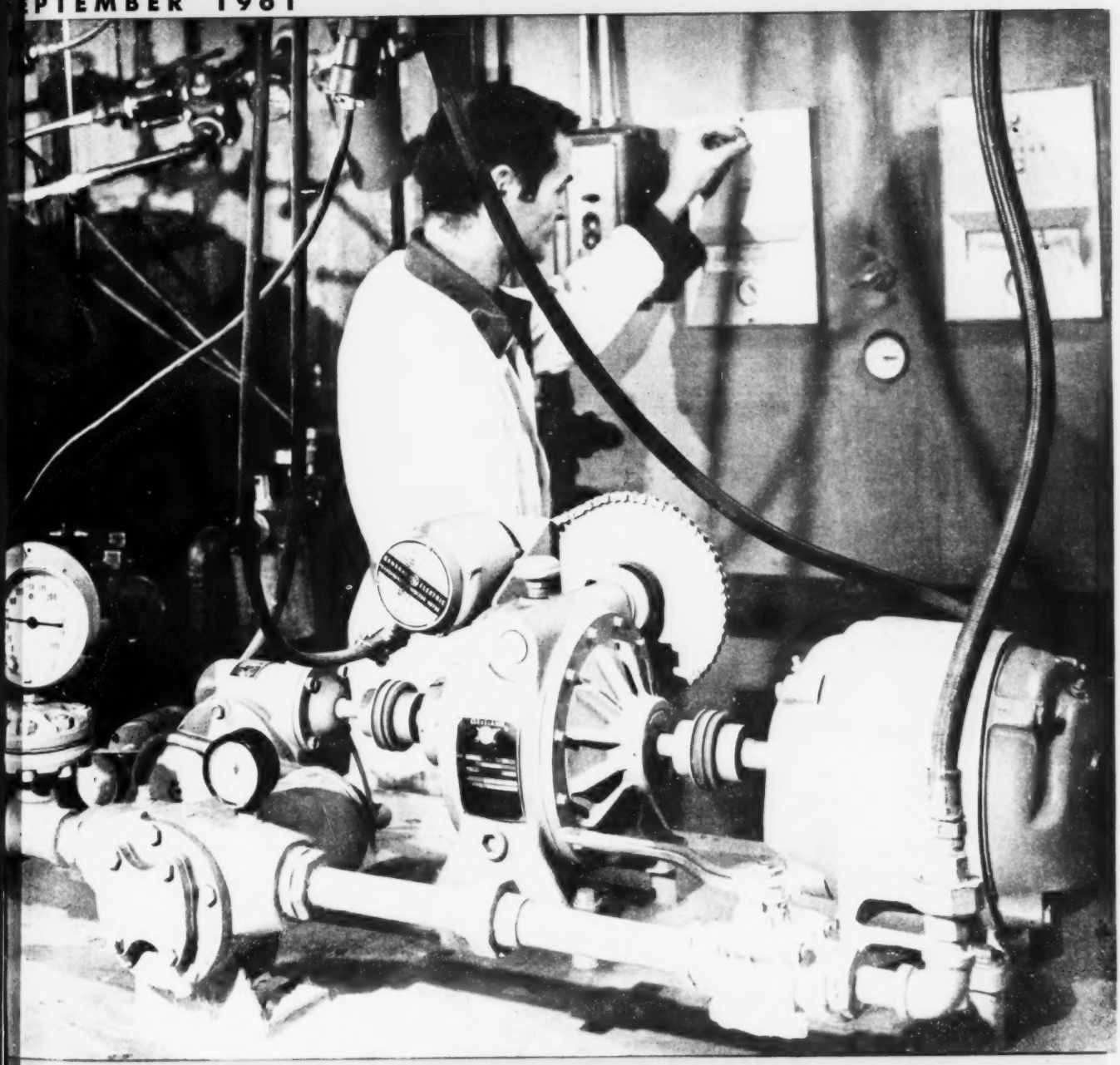
FORMERLY western industry

Western MANUFACTURING

EPTEMBER 1961



Variable speed drive meters pump output. See page 23.

Power & Power Transmission Report 23

Integrated Manufacturing, is This a Western Trend 41

Mechanized Warehouse Cuts Shipping Costs 42% 43

This 50,460 pound rudder horn steel casting was produced in National Supply's Torrance, California, plant.

National Supply's Torrance plant cast, x-rayed, annealed and shot-blasted this 50,460 pound steel casting

This rudder horn steel casting, bound for Todd Shipyards, was made in one of National Supply's largest moulding pits, 18′ x 20′. The 50,460 pound casting was made to X-ray Class 4 quality. The pouring weight of the casting exceeded 100,000 pounds to insure the proper size and number of risers to produce a sound casting.

Equipment for casting giant size jobs like this is only part of the National Supply facilities at Torrance. We are equipped to fabricate, assemble and weld the jobs you can't fit into your production schedules, or don't have the equipment to handle. We can furnish you steel forgings, billets and large bars, steel castings and special machinery. Extensive facilities are available for melting, machining, heat treating and testing.

National Supply has the largest integrated machinery-making plant in the West. These facilities are readily available to help you break the bottlenecks that sometimes slow down your entire production schedules.

If you can use these facilities, call National Supply's Torrance plant for fast, reliable service. Or send your drawings and specifications for bids and delivery information. Write to National Supply Division, Armco Steel Corporation, Torrance, California.

Steel's Symbol of strength, long life, and economy

ARMCO National Supply Division

. . . for more details, circle No. 13 on Reader Service Postcard

BREAKFAST IS SERVED...

...AND BAKER HELPED BRING IT!!!

Juice, cereal, eggs, coffee, even herrings and yogurt—whatever your breakfast preference, chances are, Baker has a hand in serving it. 9½ million tons of materials are moved each week by Baker trucks. This tonnage of food products would feed the entire United States 3 meals a day for 5½ weeks.

Baker electric trucks are balance-design engineered to every application in the food industry. Smooth electric acceleration and two-speed dynamic braking ensure complete driver control to prevent load damage—fragile foods delicately handled by *zero to maximum* metering of the hydraulic system.

Baker also manufactures a full line of gas and LP gas trucks for every application.

Your local Baker dealer will be glad to demonstrate how Baker electric trucks ensure *speedy* delivery of crisp, fresh, *nature-flavored* foods. Or write for Baker food handling application story BAS-611.

Free illustrated manual on fork truck safety-operating hints available for each of your drivers. Write Baker Industrial Trucks, 8090 Baker Avenue, Cleveland 2, Ohio.

A DIVISION OF OTIS ELEVATOR COMPANY

Baker BAKER

BAKER INDUSTRIAL TRUCKS • CLEVELAND 2, OHIO

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For more details on Food Handling, story BAS-611, circle No. 85 on Reader Service Postcard

Western MANUFACTURING

SERVES THE THIRTEEN WESTERN STATES

SEPTEMBER, 1961

VOL. 26 NO. 9

CONTENTS

POWER (cover story)	23	*Power & power transmission report*
	64	*Special manuals on drives, belts, reducers*
MANAGEMENT	41	*Integrated manufacturing, is this a coming western trend*
	48	*Wescon show is huge success*
MATERIAL HANDLING	43	*Mechanized warehouse cuts shipping costs 42%*
PRODUCTION	47	*Anodizing process is tape controlled*
METALS	50	*Flash welding of aluminum and magnesium*

COVER PHOTO

OPERATOR checks urethane foam manufacturing process at American Latex Products Corp., Los Angeles. Heart of process is precise metering of resins, catalysts and other agents through controlling pumping speed. Speed is controlled by a mechanical variable speed drive. Motor, drive and pump are shown in foreground. See page 23.

DEPARTMENTS

8	NEWS OF MEETINGS
14	CALENDAR OF WESTERN MEETINGS
54	HELPFUL LITERATURE
57	ADVERTISED LITERATURE
64	SPECIAL MANUALS ON DRIVES, BELTS, REDUCERS
70	NEW EQUIPMENT
75	WESTERN MANUFACTURING NEWS
104	WESTERNERS AT WORK
106	INDEX TO ADVERTISERS

WESTERN MANUFACTURING publishes a Southwest Zoned Edition which goes to readers in Southern California, Arizona and Nevada. Any gap in page numbering is due to differences between the Southwest edition and the regular edition.

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Editorial
EDITOR
Murat Boyle
NEWS EDITOR
Peggy V. Kopmann
SOUTHERN CALIFORNIA EDITOR, Los Angeles
William H. Durkee
News Correspondents
Lowell Richards, Seattle
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Advertising
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Glencoe, Ill.
VE 5-4228
EASTERN MANAGER
Donald J. Stroop
180 Jefferson Ave.
Tenafly, New Jersey
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Administrative
L. P. Vrettos . . . President
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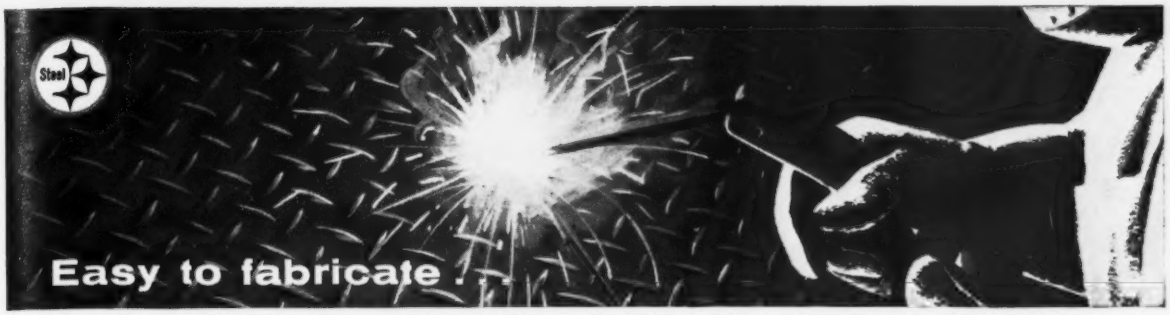
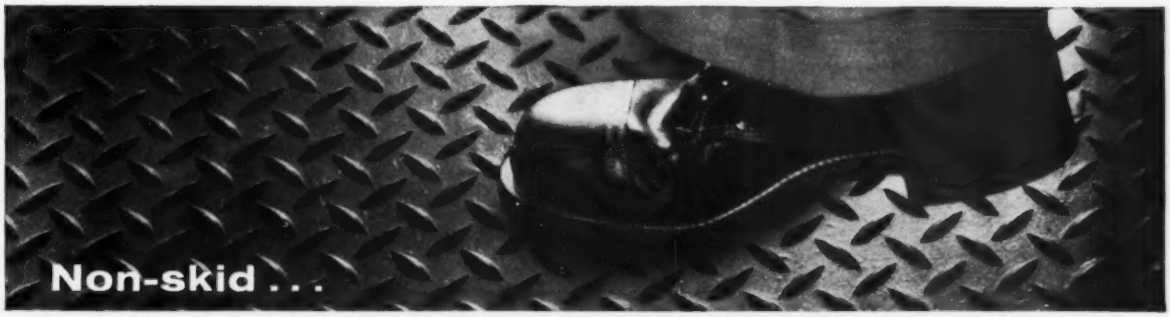


Shear, form or weld A.W. Super Diamond with standard shop equipment. Pattern matches any angle.

SUPER DIAMOND

Sweep, hose or mop A.W. Super Diamond. Water drains off in all directions. No pockets to hold dirt.

FLOOR PLATE



Reduces slides and slips. Super Diamond puts safe footing on steps, ramps, aisles; aids traction even if wet.

Write for Bulletin SD-56

ALAN WOOD STEEL COMPANY

Conshohocken, Pa. • STEEL PRODUCERS WITH THE CUSTOMER IN MIND

DISTRICT OFFICES AND REPRESENTATIVES: Philadelphia • New York • Los Angeles • Boston • Atlanta Cincinnati • Cleveland • Detroit • Houston • Pittsburgh • Richmond • St. Paul • San Francisco • Seattle Montreal, Toronto and Vancouver, Canada: A. C. Leslie & Co., Ltd.

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Simple, isn't it?

— and the time it saves!

Save an hour, two hours, three hours per change, and *you* figure what Taper-Lock mounting is worth to you!

Here is the simplest, surest method of mounting wheels on shafts. So superior that 160 manufacturers of mechanical power transmission parts use this mounting in their products—under license from Dodge. No other mounting system is so universal. Taper-Lock holds as though it were a shrunk-on fit. Yet by the simple use of its jack screws it "unlocks" like magic. No damage to shaft or machinery—no grunt nor groan nor wasted time.

Taper-Lock mounting is one of the plus features of Dodge sheaves, sprockets, couplings, conveyor pulleys. Ask your Dodge Distributor, or write us for bulletin.

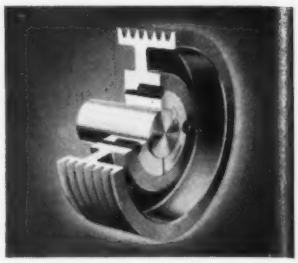
Dodge Manufacturing Corporation, 6600 Union Street, Mishawaka, Indiana

The Products with the Pluses...

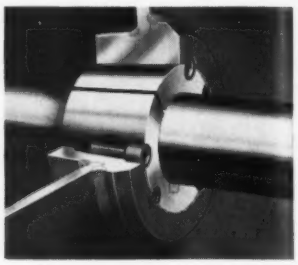
DODGE

of Mishawaka, Ind.

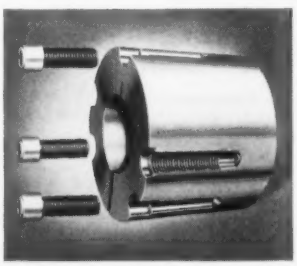
CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge he can give you valuable assistance on new cost-saving methods.



No flange, no collar, no protruding part! Modern, safe, *flush* design. Minimum space on shaft. Mounts as a unit — tighten while sighting. Easy on — easy off!

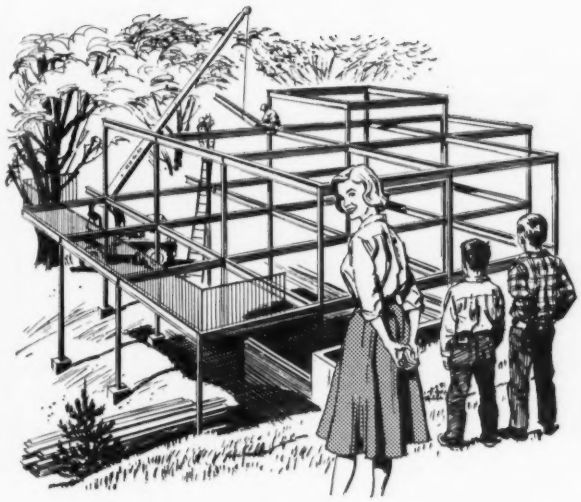


Bearing surface runs the entire length of the hub and bushing. Full compression means extreme holding power. No wobble. Taper-Lock runs true!



Interchangeable bushings. Change from shaft to shaft, from one size to another, from sheaves, to sprockets, to couplings, to pulleys. Talk about inventory economy!

. . . for more details, circle No. 16 on Reader Service Postcard



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ARCHITECTS IBSEN A. NELSEN, RUSSELL B. SABIN

DESIGNED WITH TIME IN MIND! Fast-erecting USS Steel framing in home construction provides strength and endurance for long life and lasting livability. The ultimate in design flexibility, versatile steel is the answer to future expansion and changing family needs. Ask an architect about steel's advantages. Above, Leckenby Steel frames an exciting steel home near Seattle.

new Western ideas in USS steel

STEEL FOR EVERY PURPOSE FROM A SINGLE SOURCE

GOURMET MEALS ALL A-CART! A wide variety of exciting, all-season foods is at your fingertips in cans of USS Steel. Convenient to buy, quick to fix and easy to serve, canned foods are the secret to meal versatility. They give so much goodness—in so many forms. Be a smart shopper. Short-cut market trips with long range planning—stock up with delicious foods in steel.

STORAGE IN ORBIT with functional, all-steel "lazy susan" revolving shelves. A convenience plus for up-to-date kitchens, shelves like this have steel's extra strength to support heavy loads and still turn freely. They won't stick because stable steel retains its shape and never warps or swells. Washington Steel Products Company makes shelves and hardware in Tacoma with USS Cold Rolled Sheets.

REST BEST... on a thick mattress made with firm, form-supporting innersprings of USS Steel. The refreshing approach to sleep, innerspring mattresses permit free circulation of air for extra comfort and cleanliness. These mattresses last longer too, because resilient steel springs them back into shape. Look for the Steelmark. It's your sign of a good buy for a good night's sleep.

USS IS A REGISTERED TRADEMARK

This mark tells you a product is made of modern, dependable steel. Look for it on the products you buy.

Steel

Write Consumer Service, 120 Montgomery St., San Francisco 6

USS **Columbia-Geneva Steel Division of United States Steel**

NEWS of MEETINGS

First Western Show On Lighting Will Be In L. A. On Oct. 3-5

NEW CONCEPTS and innovations in fixtures and light sources will be among the items featured at the Lighting Progress Exposition to be held October 3, 4 and 5 in Los Angeles at the Hollywood Palladium. Appointed official hostess for the Show is Edith Loder, who also has been dubbed "Princess of Light."

Sponsored by the Electric League of Southern California, the Exposition is the first major trade show in the West to be devoted exclusively to the lighting field and will be attended by architects, builders, building owners and managers, contractors, decorators, consulting engineers, maintenance engineers and wholesalers in the industrial, commercial, and residential fields. The show will open at 10:00 a.m. Tuesday, October 3, and will run from 10:00 a.m. to 10:00 p.m. all three days.

The profit-making possibilities of light as a building component will be emphasized to the invitational audience. Exhibits have been designed to show how light can be used to save and make money in industrial, commercial and residential remodelling as well as new construction. Light as a health and efficiency factor, light as a source of heat, and light as a design element indicate some of the new profit potentials of light for those who specify and use it. New ideas in light, thus focused on their application for profit, will be demonstrated by leading manufacturers and innovators in the field, whose names read like a "Who's Who of Lighting."

Running currently with the show will be daily forums, both afternoon and evening sessions, which will explore the application of the modern light sources on exhibit to industrial, commercial and residential buildings, both new and remodeled. The emphasis of the forums will be on how to fit the new techniques and products into all types of structures as an effective sales tool.

Lighting specialists who have taken active leadership in the Show planning are Roy Kreyser, Los Angles Department of Water and Power; and Roy Dahlin, Southern California Edison Company. The committee includes prominent manufacturers, utility executives, and other leaders in the lighting field.

Highlighting the current list of exhibitors are Shalda Mfg. Co.; Sylvania Electric Products; Flood-Lite Service, Inc.; Sunbeam Lighting; American Louvre; C. A. Peterson Co.; Litecraft; De-Lights of California; General Electric; Pyle National; Curtis All-Brite; Day-Brite Lighting; Globe; Lightolier; Westinghouse; Kim Lighting; Howard Cristy Electric; Smoot Hollman Co.; Virden Lighting (Lighting Dynamics); J. E. Shull Nu-Art; Photo Research; Luminous Ceilings; Major Equipment.

Their exhibits will cover the newest in fixtures for every indoor and outdoor use, as well as light bulbs, panelescent lamps, iodine quartz filament lamps, electronic indicator lamps and sockets, a new square fluorescent lamp, "walls of light," "ropes of light" and "dancing light."

THE PRINCESS OF LIGHT announces the Lighting Progress Exposition to be held October 3, 4 and 5 at the Hollywood Palladium, sponsored by the Electric League of Southern California. The first major lighting trade show ever to be held in the West is being planned by a group of leading executives in the utility and lighting fields, pictured here with the newly appointed "Princess." Left to right (first row) are A. Howard Williams, Exposition Manager; R. H. Cockfield, Los Angeles Department of Water and Power; Jack Rollins, National Electrical Contractors Association; William Shalda, Shalda Manufacturing Company; P. R. Freeman, Sunbeam Lighting Company; E. C. Herron, General Electric Company; left to right (back row) are Roy Kreyser, Department of Water and Power; Roy Dahlin, Southern California Edison Company; Mel G. Kennedy, Electric League of Southern California; S. W. Scott, Graybar Electric Company; Lou Barrett, Sylvania Electric Products, Inc. and N. A. Blumberg, Lightolier Company.

Information regarding the Show and exhibit space may be obtained from A. Howard Williams, Exposition Manager, 2140 Westwood Blvd., Los Angeles.

Electronic Distributor - Representative - Manufacturer Conference To Be Held

THE SOUTHERN CALIFORNIA chapter of the Electronic Representatives Association will play host to more than 400 manufacturers and regional distributors at the Second Bi-Annual Palm Springs Conference next February, according to Ellard E. Strassner, Distributor Division Chairman, and Jack Carter, Conference Chairman. The event, featuring business sessions and a social program, will be held at the Riviera Hotel beginning Saturday, February 3 and ending Tuesday, February 6.

Invitations have been mailed to all manufacturers represented by members of the local ERA Distributor Division. Initial plans call for thirty-nine, 20 minute business sessions.

This year's conference will serve to initiate Western

(Continued on page 14)

Speeds up to 2600 feet per minute, and no lube problems with Chevron Industrial Oil

This huge paper machine of MacMillan, Bloedel and Powell River Co., Port Alberni, British Columbia works round-the-clock seven days a week, yet bearings and retainer sleeves remain free of carbon and varnish using Chevron Industrial Oil.

"Chevron Industrial Oil 68X gives us excellent performance under really tough conditions," says Al Law, Lubrication Supervisor. "The acidity has remained low even though we run at speeds up to 2600 feet per minute and dryer temperatures average 270°F. or better. Lines stay clean and the oil doesn't eat into filter cloths. And, we've never lost a bearing due to lubrication."

The Port Alberni Plant operates a Flakt pulp dryer, John Inglis specialty and two Beloit paper machines to produce 1200 tons of pulp, newsprint and specialty products per day. Chevron Industrial Oil has worked so well they expect it to last twice as long as originally anticipated. Lubrication problems? Let a technically qualified Standard Engineer solve them for you. His practical experience and the wide range of top quality Standard products assure an economical solution to your lubrication problems.

The largest field force of lubrication engineers in the West is at your service. For this valuable free technical help, just call your local Standard office or write Standard Oil Company of California, 225 Bush Street, San Francisco 20.

CHEVRON Industrial Lubricants

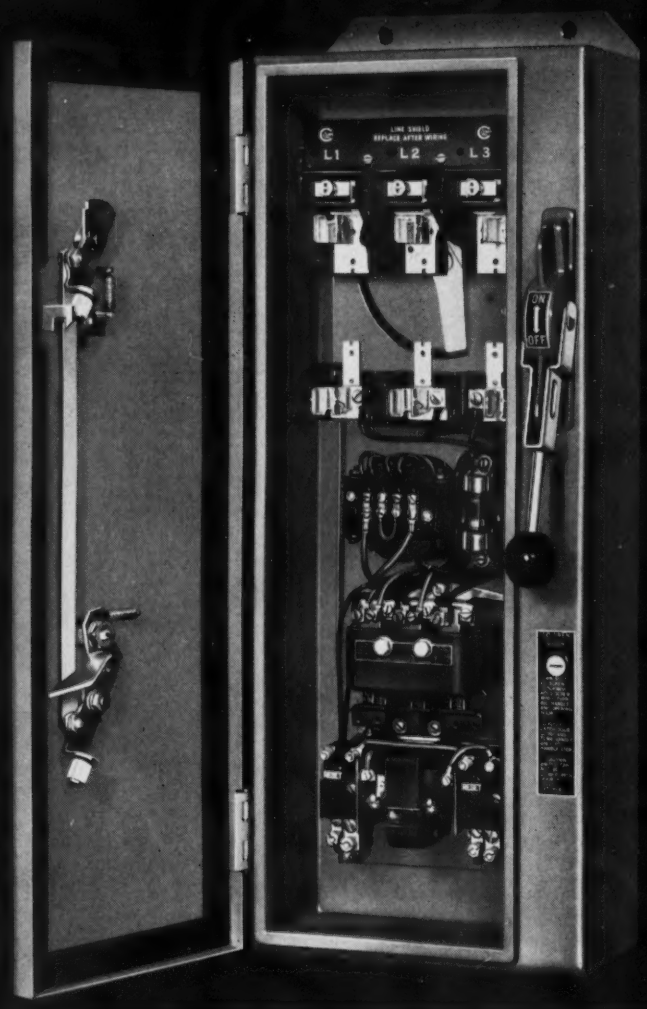
STANDARD OIL COMPANY OF CALIFORNIA

TRADEMARK "CHEVRON" AND CHEVRON DESIGN REG. U.S. PAT. OFF.

. . . for more details, circle No. 17 on Reader Service Postcard

NEW FROM CLARK

NEMA 12 SAFETY COMBINATION STARTERS WITH THREE EXCLUSIVE FEATURES



Safety fusible combination starters are gaining wide interest throughout industry. But only the new Clark line offers these important features:

- *New Clark-built visible blade disconnect switch with double-break, silver-alloy to silver-alloy contact surfaces*
- *Disconnect switch accommodates NEC or the new Class J Current Limiting fuses*
- *To simplify installation, complete unit can be removed from enclosure in seconds with no disassembly of handle mechanism*

New Clark Safety Starters offer non-teaseable, snap-action disconnect switch operation. Cabinet design permits only authorized persons to open door when switch is on, or to close switch when the door is open. Dust-tight operation is assured by interlock which requires door handle to be closed and door tightly latched before disconnect switch is operable.

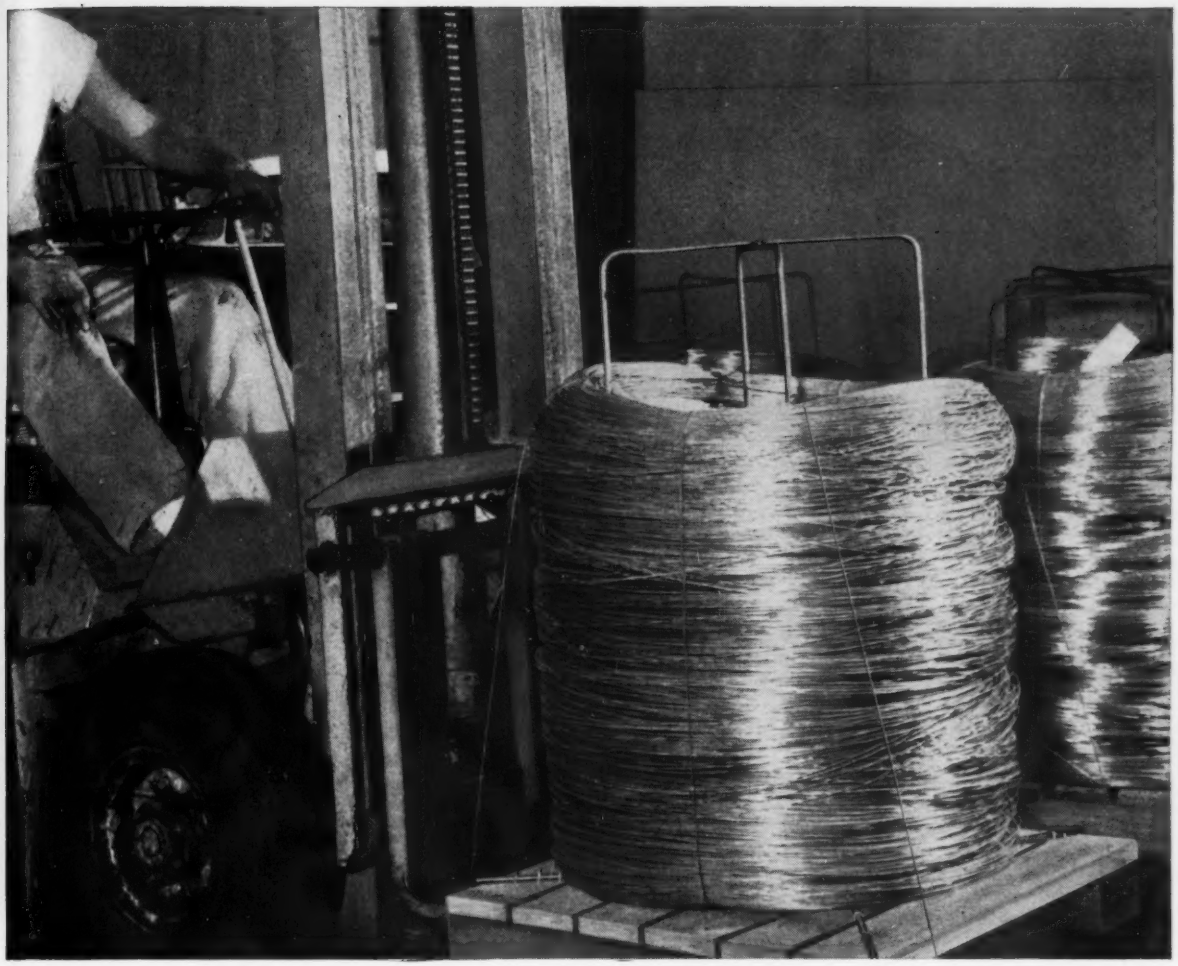
These Clark Safety Fusible Combination Starters are available with interchangeable fuse clips to accommodate a full range of fuses, and are offered with famous Clark "CY" Contactors in sizes 0, 1, and 2. Designed for NEMA 12 (industrial) service, they also are suitable for NEMA 5 (dust-tight) applications. For information, call the nearest Clark distributor or sales office, or write: 61SCS1

THE CLARK CONTROLLER COMPANY

MAIN PLANT: CLEVELAND, 10 • **WESTERN PLANT:** LOS ANGELES, 58
IN CANADA: CANADIAN CONTROLLERS, LIMITED, TORONTO, ONTARIO

TO SERVE OUR WESTERN FRIENDS BETTER—*Los Angeles Division:* 4755 E. 49th St. A modern manufacturing plant and warehouse with complete sales, engineering and service facilities.—*San Francisco Warehouse and Sales Office:* 1770 Yosemite Ave. Complete stock of motor control apparatus available for quick delivery.—*Sales Offices* also in Albuquerque, Denver, Phoenix, Portland, Salt Lake City and Seattle.

. . . for more details, circle No. 18 on Reader Service Postcard



Savings in production costs start with the arrival of CF&I's Stem-Paks at a West Coast fabricator.

CF&I Stem-Paks® are Packaged for your Production

What does "packaged for your production" mean? Here's an example of what it meant to the president of a wire fabricating plant that switched to CF&I Stem-Paks:

"Up to 75% of our production downtime was caused by using too many small coils. Then we changed to CF&I Stem-Paks, which hold 500 to 1000 pounds of continuous wire. These larger packages keep each machine running as much as 1½ hours longer per day, and allow for free unwinding without snarling. As a result, we've increased our production 50%."

In addition, CF&I Stem-Paks provide greater ease of handling... reduce scrap loss ...and save storage space. Each Stem-Pak consists of a center core attached to a wooden base which is mounted on 4″ runners. Center cores are available in the following sizes (inside diameter): 14″, 17″ and 21″.

Stem-Paks are only one of a wide range of wire packages produced by CF&I. Our engineering staff will be happy to study your operation and recommend the one or more packages that will increase your production and cut your costs. For complete details on Stem-Paks, write for Wire Package Bulletin Number 3 or contact your nearby CF&I sales office. 8354-A

The Colorado Fuel and Iron Corporation

Albuquerque • Amarillo • Billings • Denver • El Paso • Fresno • Ft. Worth • Houston
Kansas City • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo
Sacramento • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Wichita

Steel

Serves you every day in a thousand ways.

... for more details, circle No. 19 on Reader Service Postcard

An outstanding line of LOUIS ALLIS adjustable-speed drives from ½ to 2500 hp.

Louis Allis offers you a complete line of adjustable-speed drives with various characteristics for every application where adjustable speed is required.

Experienced Louis Allis field engineers, supported by regional and factory industry specialists, will help you select the best drive or drive system to meet *your* requirements.

The Louis Allis line of drives provides outstanding control features ranging from simple manual to precise electronic or transistorized control. Selection of control varies, of course, with the nature of the installation and the precision required. Where desirable, speed regulation as close as .1% is obtainable.

Controls can be provided which automatically respond to temperature, pressure, or flow. Other control features include threading, inching, jogging, logarithmic acceleration, torque-limit acceleration, tachometer feedback... and many other control provisions that can exactly tailor a Louis Allis drive to *your* operation.

For process plants or applications involving inter-related motors and multiple drives, Louis Allis engineers can provide complete "systems engineering," furnishing all electrical rotating components and control.

For expert assistance, call your local Louis Allis District Office listed in the Yellow Pages under "Electric Motors"...or write direct to The Louis Allis Company, 438 East Stewart Street, Milwaukee 1, Wisconsin. Ask for Bulletin 2900, "Louis Allis Adjustable Speed Drives."

*TM EATON MFG. CO.

LOUIS ALLIS

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

BURLINGAME • DENVER • LOS ANGELES • PHOENIX • PORTLAND • SALT LAKE CITY • SEATTLE

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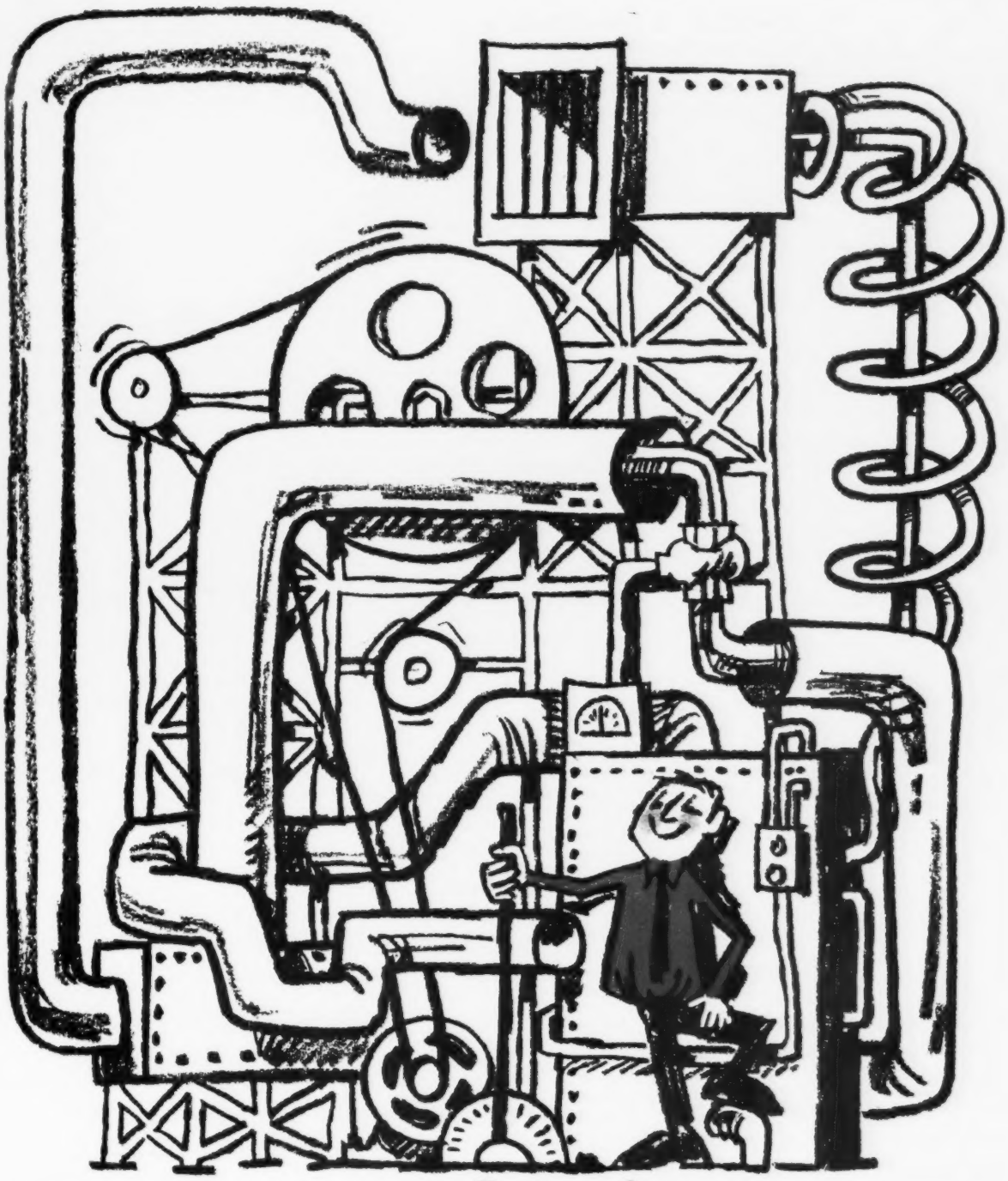

I MADE IT OUT OF aluminum TUBING

I began with the idea that Baker could supply me with every size and analysis of aluminum tubing there is. They could. "Then cut all those sizes into 4722 different lengths," I said. They did. Then I threw them a curve (I thought). I said, "Get all of it over here this afternoon." They did.

BAKER TUBE CO.

1540 Calzona St., Los Angeles 23. ANgelus 3-7231
1255 22nd St., San Francisco 19, VAlencia 6-6220
2668 Fifth Ave., San Diego 3, BElmont 2-7535

(Continued from page 8)

Electronic Week. It will be followed immediately by the Pacific Electronic Trade Show, to be held in Los Angeles. Manufacturers exhibiting at the show will be invited to participate as guests at the Palm Springs Conference.

All committee chairmen have been appointed and the committees are functioning. This year's committee chairmen are: R. L. Stone, Attendance; Norman Marshank, Finance; Wes Alderson, Rules & Regulations; Mark Markman, Facilities; Bert Moore, Room Assignments; Jack Berman, General Program; Leon Ungar, Social Program; Earl Rush, Business Sessions; and Ellard Strassner, Scheduling.

Aerospace Electrical Society Display Will Be Largest in Society History

THE 19th Annual Aerospace Electrical Society Display is expected to be the largest ever held with nearly 250 firms displaying more than $15 million of advanced equipment and products, including electrical and electronic systems, sub-systems equipment and components.

Over 20,000 engineers and executives are expected to visit the event which is scheduled for November 15-17 at the Pan Pacific Auditorium, Los Angeles. Hours for this year's display are: November 15-16, 6:00 P.M. to 10:00 P.M.; November 17, 1:00 P.M. to 10:00 P.M.

Pallet Users' Conference Scheduled for Portland, Ore. on Oct. 11-12

THE THIRD WESTERN Pallet Users' Conference, by the National Wooden Pallet Manufacturers Association, will be held at the Hotel Multnomah in Portland, Oregon, on Wednesday, October 11, and Thursday, October 12. Participating in the plans for the 1961 Conference will be the Purchasing Agents' Association of Oregon. Two previous Conferences of this kind have been held, one at Stanford University and one in Los Angeles.

The Conference will feature talks by leading authorities on such subjects as the operation of Pallet Pools, purchasing and specifying wooden pallets, correct use and maintenance of pallets, inspection procedures, the importance of proper design of wooden pallet containers for industrial and agricultural uses, and how to cut packaging costs with palletization. The program will also include a panel of pallet users, who will discuss "The Problems of Purchasing Wooden Pallets." The purpose of the Conference is to afford all pallet users an opportunity to learn more about the technical aspects and savings involved in the procurement and application of wooden pallets and pallet containers.

The Conference is open to purchasing agents, industrial engineers, traffic managers, warehouse managers, and all personnel connected with the use of pallets in materials handling. It is also open to wooden pallet manufacturers and sales organizations. The Conference will afford a firsthand opportunity for participants to ask technical questions on palletization and to secure the correct answers from industry experts.

The Registration Fee is $15.00 per person, which includes luncheon on the first day. The program will be held in the Emerald Room of the Multnomah Hotel, and will run from 9:30 A.M. to about 4:30 P.M. on the first day, and from 9:30 A.M. to 12:30 P.M. on the second day. Registrations must be made in advance directly to the National Wooden Pallet Manufacturers Association, 609 Barr Building, Washington 6, D. C. Checks for the Registration Fees must be made out to the National Wooden Pallet Manufacturers Association.

Calendar of Western Meetings

Sept. 24-27—2nd RARE EARTH CONFERENCE. Colorado Hotel, Glenwood Springs, Colorado. Sponsored by Metallurgy Division, Denver Research Institute, University of Denver.

Sept. 24-28—NATIONAL CONVENTION SLIDING GLASS DOOR & WINDOW INSTITUTE. Mountain Shadows resort, Scottsdale (Phoenix) Arizona.

Sept. 27—MEETING OF AMERICAN INSTITUTE OF PLANT ENGINEERS, 6:30 p. m. Rodger Young Auditorium, Los Angeles.

Oct. 4-6—WESTERN REGIONAL CONFERENCE NACE. Benson Hotel, Portland Ore. Sponsored by National Association of Corrosion Engineers.

Oct. 7-10—WESTERN BUILDING INDUSTRIES EXPOSITION. Great Western Exhibit Center, Los Angeles, California. Sponsored by Association of the Western Building Industries Council.

Oct. 11-12—3rd WESTERN PALLET USERS CONFERENCE. Hotel Multnomah, Portland, Oregon. Sponsored by National Wooden Pallet Manufacturers Association.

Oct. 15-19—NATIONAL CONVENTION PRESTRESSED CONCRETE INSTITUTE. Brown Palace and Cosmopolitan Hotels, Denver, Colo.

Oct. 25-27—MEETING OF AMERICAN CERAMIC SOCIETY. Jack Tar Hotel, San Francisco.

Nov. 3—AMERICAN IRON & STEEL INSTITUTE MEETING. Mark Hopkins Hotel, San Francisco.

Nov. 13-16—INTERNATIONAL CONFERENCE ON MAGNETISM & MAGNETIC MATERIALS Thunderbird Room, Westward Ho Hotel, Phoenix, Arizona. Sponsored jointly by American Institute of Electrical Engineers and American Institute of Physics.

Nov. 15-17 — 19th ANNUAL AEROSPACE ELECTRICAL SOCIETY DISPLAY. Pan Pacific Auditorium, Los Angeles. Sponsored by Aerospace Electrical Society.

Feb. 3-6, 1962—2nd BI-ANNUAL PALM SPRINGS CONFERENCE of the Electrical Representatives Association, Riviera Hotel, Palm Springs, California. Conference brings together representatives, distributors and manufacturers. Sponsored by Southern California Chapter of E.R.A.

Feb. 7-9—NATIONAL WINTER CONVENTION ON MILITARY ELECTRONICS. Ambassador Hotel, Los Angeles, California. Sponsored by Institute of Radio Engineers, Professional Group on Military Electronics, Los Angeles Section IRE.

Feb. 15-17—GOLDEN GATE METALS CONFERENCE. Fairmont Hotel, San Francisco, California. Sponsored by American Society for Metals.

Feb. 19-21—NATIONAL MEETING of Aerospace Scientists. Jack Tar Hotel, San Francisco, California. Sponsored by Institute of Aerospace Scientists.

NEW AUTOMATIC® PALLET TRUCK WITH COMPACT PRICE AND SIZE

★ **MODEL RP**
Capacities 4000 and 6000 lbs.

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★ **Simple, conveniently located, easy-to-operate controls.**

★ **Accepts 12 or 24 v. batteries.**

★ **Speeds up to 5.25 mph.**

★ **Spring-loaded casters increase stability, safety.**

★ **Interchangeable parts with other AUTOMATIC trucks. All parts easily accessible.**

We've re-engineered our pallet truck line . . . and you're the big winner. More functional design permits a lower price tag and gives you a better truck in the bargain. For example, the new Model RP uses a special caster system for greater cornering stability and safety. Casters at the two rear corners are spring-loaded to maintain constant contact with the floor. A rugged, one-piece frame concentrates the weight on traction and load-bearing wheels, enabling casters to pivot easily.

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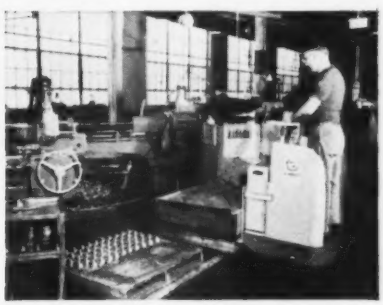
Model RP is equipped with the famous AUTOMATIC Class H silicone-insulated drive motor which is specially built for heavy-duty use and long life. A unique spring-applied, hydraulically-released brake gives long service without complicated linkage adjustment. The battery can be removed from either side or by overhead chain hoist. Extra room and operator comfort have been provided.



DOES THE WORK OF TWO WALKIES ON SOME JOBS. Compared to walkies, Model RP is twice as fast, twice as efficient for medium and long distance horizontal movement of pallets.

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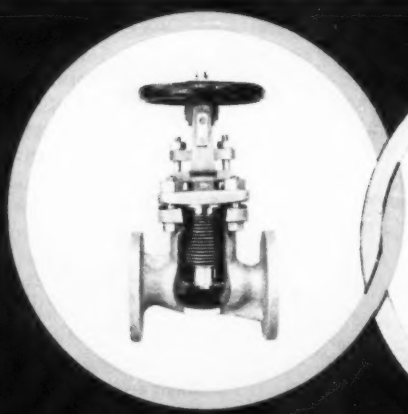

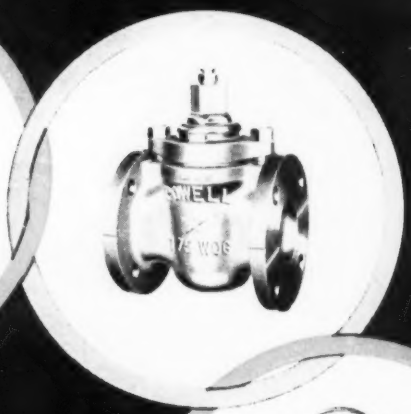

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POWELL PERFORMANCE PAYS OFF

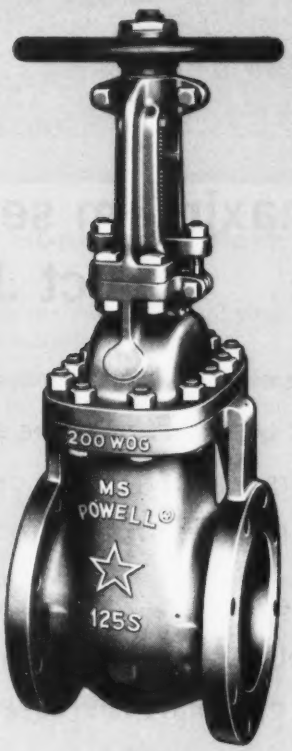
Any way you look at it, Powell performance really pays off. Take "availability" for instance.

You'll find that Powell makes just about any type of valve you may need—for oil, water, gas, steam, air and corrosive fluid applications. The same holds true for virtually any temperature and pressure. What's more, you'll find Powell valves are available in industry's widest selection of bronze, iron, steel and special alloys—from aluminum to zirconium. (The fact is, Powell pioneered application of special alloys in valve design.)

In short, you'll find Powell performance also includes outstanding availability—of exactly the type valve you need. And, since Powell maintains large stocks both at the factory and key points across the country—you get exactly what you need, when you need it. For further information, contact your nearby Powell Valve distributor or write The Wm. Powell Co., Cincinnati 22, Ohio.

125-pound All Iron Gate Valve. Outside screw rising stem and yoke. Flanged ends, 2" through 30". Screwed ends, 2" through 8". Iron body bronze mounted valves also available.

175-pound W.O.G. Semi-Steel flanged end Lubricated Plug Valve. Wrench operated. Sizes 1" through 4". Available also with screwed ends. Catalog of complete line on request.



125-pound Iron Body Bronze Mounted Swing Check Valve. Bolted flanged cap. Can be used in either horizontal or vertical position. Sizes, flanged, 2" through 18"; screwed, 2" through 4". Can also be furnished in all iron.

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POWELL DEPENDABLE VALVES

THE WM. POWELL COMPANY CINCINNATI 22, OHIO

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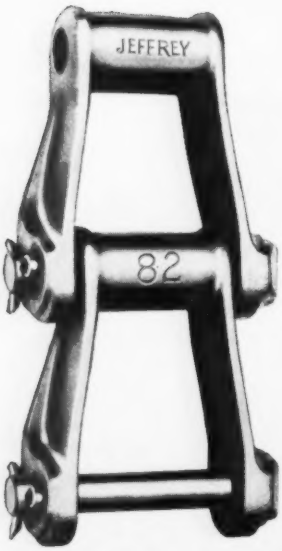
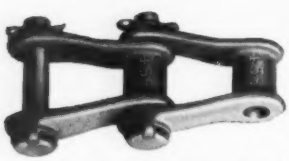


Type H Mill Chain – For increased speed and loads under clean or semi-gritty conditions.

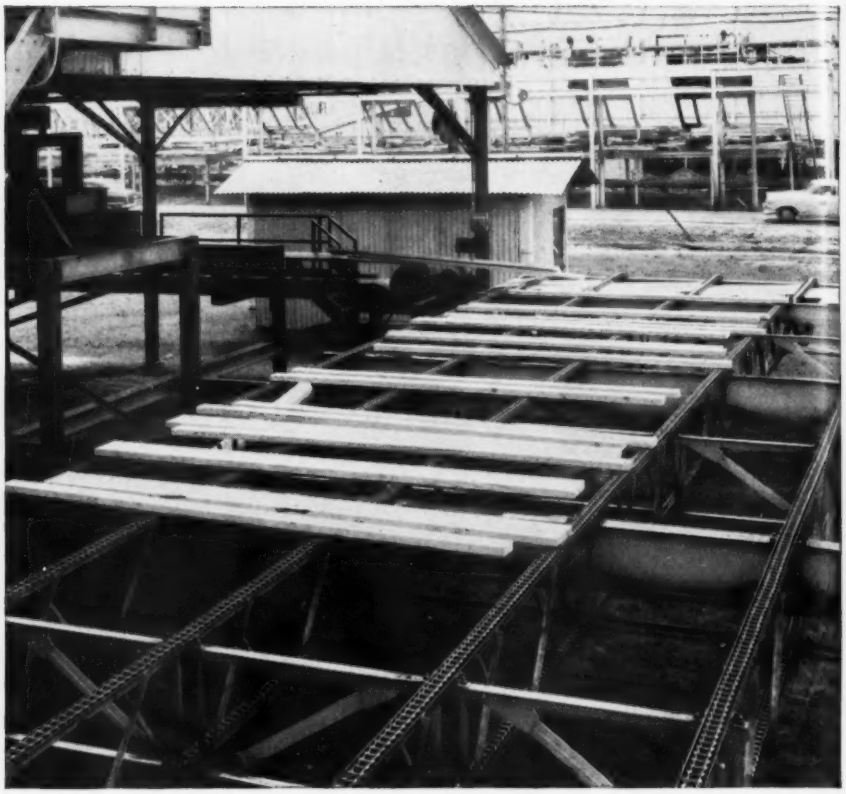
Roller Top Chain – (Patented) Used on sorting conveyors.



Class 400 Pintle Chain – Provides durability. Sizes of corresponding pitch work in place of Detachable Chain.

Refuse Chain – Broad sliding surfaces distribute wear over large area. Increase life.

Type PW-132 Combination Chain (Patented) Ruggedly constructed. Designed with extra large wearing surfaces.



For maximum service life, select JEFFREY CHAIN

Many types of Jeffrey chain are used in the lumber and woodworking industries; typical examples are shown here. All profit by Jeffrey's many years of experience in designing and making chain for maximum life and efficiency.

Your Jeffrey distributor can usually supply you from stock. See him for help in selecting chain or write The Jeffrey Manufacturing Company, 920 North Fourth Street, Columbus 16, Ohio.

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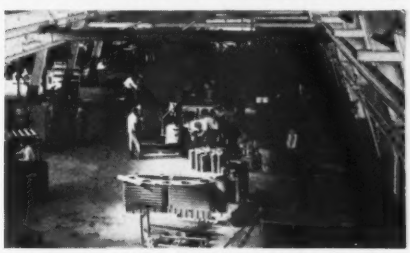
Made exclusively from *virgin* metals, the consistency of these copper-base alloys makes them ideal for bearings, gears, worm wheels, hydraulic equipment, slides, gibs, and numerous other parts that must withstand abuse.

Ampco's West Coast Division can also give you prompt delivery of AMPCO metal sand castings, centrifugal castings, machined parts, and forgings. In addition, Ampco can furnish you with sand or centrifugal castings of a wide range of commercial bronzes, as well as pure copper, and commercial grades of standard aluminum casting alloys.

Off-the-shelf delivery is available for AMPCO metal sheet and plate, extruded rods, centrifugally cast semi-finished bars; and AMPCO-WELD® resistance welding products, including extruded rod and bar, spot-welding electrodes, seam-welding wheels, holders and accessories.

For fast delivery you can depend on, call LUdlow 8-9111. Write for Bulletin.



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Centrifugal casting equipment for semi-finished bar and tube.

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NEW COLOR

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STOPS RUST AND PROVIDES LASTING BEAUTY

Gone are the days when color was used for the sake of color alone. Today, color is functional—helping to improve morale and increase efficiency—serving to color-code and mark safety areas, etc. The Rust-Oleum New Color Horizons System goes even further. It combines four important factors (1) the ability to stop rust, (2) smart, modern color harmony, (3) the durability to last and last, (4) ease of application that saves time, money, and metal. See how this system can bring lasting beauty to your plant, machinery, equipment, tanks, fences, etc. Your Rust-Oleum Industrial Distributor, with your Rust-Oleum Factory Specialist, will be happy to survey your plant and provide complete recommendations. Prompt delivery is assured from Industrial Distributor stocks in all principal cities of the U.S., Canada, and many countries around the world.

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Apply Rust-Oleum 769 Damp-Proof Red Primer directly over sound, rusted surfaces to STOP RUST and cut maintenance costs

Just scrape and wirebrush to remove rust scale and loose rust—then brush Rust-Oleum 769 Damp-Proof Red Primer right over the remaining rust. Its **specially-processed** fish oil vehicle penetrates rust to bare metal as proved in radioactive tracing studies. You save time and money, as costly surface preparations are usually reduced.

RUST-OLEUM®

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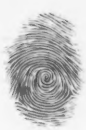
STOPS RUST!®



Distinctive as your own fingerprint.
There are imitations,
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Accept no substitute.

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You take the brush! Try a free test sample!

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IF YOU WANT SUPERIOR PRECIPITATOR PERFORMANCE

A precipitator is a lifetime purchase. Once it is installed, you must live with it, whether you like its habits or not. Because of that Buell urges you to look for the following features when you are making the major investment represented by an electric precipitator.

CONSTRUCTION

1. Custom designed, flexible—Buell helps you determine your precipitator needs, then designs a unit specifically for your requirements. Since Buell SF Precipitator sizes change by only 16" increments, you can get exactly the size you need, without compromise of size, space, and cost.

2. Simplified erection—Modern construction and assembly-marked components and a design that facilitates simple installation, make Buell SF Precipitators easy to erect without specialized contractors. Erection is supervised by Buell engineers, to ensure satisfactory operation.

3. Rugged construction—Simple, rugged construction gives you high efficiency, combined with negligible maintenance costs.

GAS FLOW

4. Uniform gas distribution—Buell designs the entire gas system for its precipitators—including connecting flues with adjustable turning vanes if needed. In addition, at the inlet, special field-adjusting baffles ensure uniform flow across the entire face of the unit. Buell has complete laboratory facilities to determine dust or gas flow pattern with specially constructed three dimensional precipitator models.

ELECTRICAL SYSTEM

5. Fool-proof power supply—Buell silicon rectifiers are compact, lightweight, highly efficient. They need no maintenance—another reason for the top performance of a Buell SF Precipitator.

6. Rigid suspension—The emitting frame of a Buell SF Precipitator is hung from four temperature and shock resistant quartz insulators, each sealed in an individual heated compartment. With this rigid system, electrical distance from emitting to collecting electrode is held constant. This produces uniformly high emission for peak efficiency.

7. Peak emission—Exclusive Spiralectrode® emitting electrodes are fixed top and bottom to the emitting frame. Self-tensioned and permanently aligned, they present areas of maximum emission per unit of power input. Top emission can be maintained with maximum applied voltage, because Spiralectrodes eliminate misalignment.

8. Minimum maintenance—The common maintenance headache in most precipitators is frequent replacement of emitting electrodes. Because of rugged suspension and patented electrode design, Buell's 10-year replacement record in this critical area is under 2%.

RAPPING

9. Effective rapping—avoids reentrainment—Buell mechanically raps one row of electrodes at a time, in a continuous cycle. Special pockets in collecting electrodes, and section-by-section rapping in the direction of gas flow, ensure against reentrainment.

You're sure to be pleased with the superior performance and minimum maintenance you'll get with a Buell SF Precipitator! Buell Engineering Co., Inc., Dept. 67-I 123 William St., New York 38, N. Y. electric precipitators • cyclones • bag collectors • combination systems • classifiers. **Member Industrial Gas Cleaning Institute**

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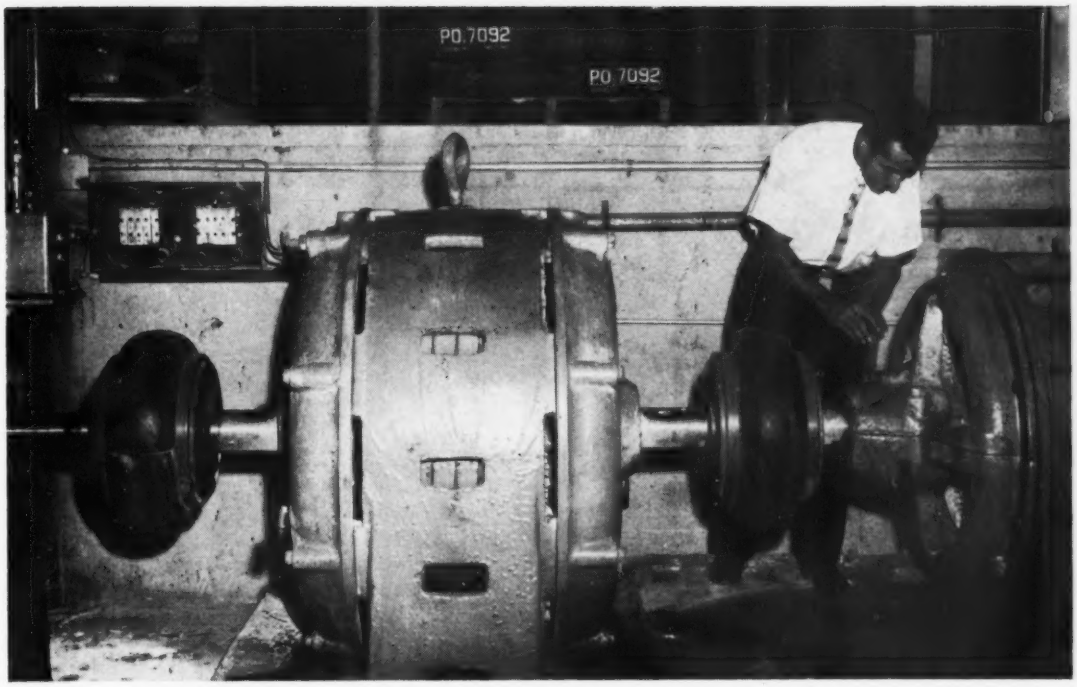


MIXER is driven at different speeds by using two motors alternately at Burke Rubber Co., San Jose, Calif. Paraflex flexible couplings are mounted on the shafts of the two motors, which drive the Banbury mixer through a pinion bull gear. Some 30 manhours of installation time was saved by using this type of coupling.

POWER AND POWER TRANSMISSION

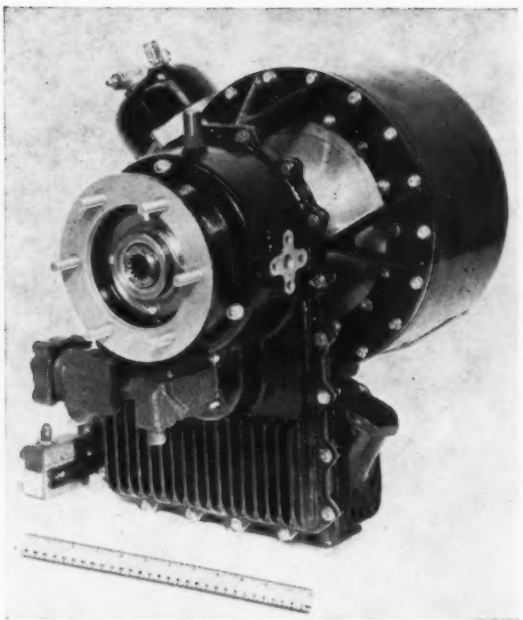
Western MANUFACTURING

A SPECIAL REPORT

Western plants are spending more on power transmission equipment. One reason why is trend to variable speeds. Chances for profit saving are better than ever since improvements in all types of equipment have broadened their field of use and increased selection possibilities.

WESTERN manufacturing plants as a group are the newest and most modern in the country. As such, they clearly reflect the general advances made in all areas of manufacturing. Nowhere is this more evident than in the field of power and power transmission.

There is a long term, ever increasing trend toward the use of more power in plants. This trend is the result of a number of reasons. Plants are using power equipment in jobs formerly done by hand. Machines are becoming larger, faster, more intricate and more automatic. Increased speed demands heavier equipment and takes more power and heavier power transmission equipment. Intricate and automatic equipment calls for an increase in the number of power and power transmission systems used. At the same time, production demands for more precise operation and closer tolerance have brought about a need for more flexible controls on equipment. This has caused industry to depart still further from a



SMALL GAS TURBINE built by AiResearch Phoenix weighs only 45 to 60 lbs., yet supplies 30 to 50 hp. Turbines have extreme light weight to high horsepower ratio and their use to drive generators or compressors is increasing.

former, somewhat standard, practice of using a common power source and install individual drives and motors for each power application.

All of these changes are found in modern Western manufacturing plants. Today's manufacturing equipment is economical and able to perform an operation better and faster. However, there is an increased cost in power and power transmission equipment. As these practices grow in Western plants, power and power transmission costs rise correspondingly.

What is happening is that this equipment, always a significant manufacturing budget item, is steadily costing more. The possibilities of profit saving in this field, therefore, take on an added importance.

Fortunately, the chances for savings are improving also. There have been improvements in all types of power and power transmission equipment. Most of these advances cannot be classified as revolutionary. They are rather of the slow, steady type. In some, new materials are used in old applications; in others, old principles are adapted to new applications; and in still others, better manufacturing methods or improved design has provided a better product.

The important fact is that improvements are constantly being made throughout the entire power and power transmission field, and that these improvements are altering established concepts of equipment use. Each type of power or power transmission equipment has had an established area of use. Where there was an application in a certain area, the selection of that specific type of equipment was fully justified.

This is not the case now and it is becoming less so. As equipment improvements are made they tend to broaden the areas in which the equipment can be used. In many cases, these areas of use now overlap considerably. Often upon investigation, it is possible to find several suitable items of equipment, which can be used for an application. This considerably increases the possibility of selection and places the user in a much more favorable position to cut costs.

POWER

The primary power source for almost all Western plants is electricity. Plant electrical power usually is provided by one of the region's power companies, like Pacific Gas and Electric in Northern California. A second power source is natural gas. This is mainly used for furnaces and other types of equipment involving heat. Gasoline, diesel fuel and bottled gas also have limited applications in Western manufacturing plants. These fuels are found doing such jobs as powering vehicles, heating steam boilers, running generators or compressors.

Often a Western plant, though it receives its electricity from outside, does employ a supplementary power source. This usually is in the form of a generator set that will provide enough power to take care of critical processes if a stand-by unit is needed. Seldom is the unit large enough to handle all the power needed for the plant. Another place where supplemental power is used for outlying equipment, where the cost of a separate primary power source can be justified as against using plant power.

One new and interesting trend in power equipment is the use of turbine type engines, powered by gasoline, natural gas or diesel fuel. These are used to run either generators or compressors. Their characteristics are extremely light weight and high output. Industrial units putting out 30 to 50 hp will weigh from 45 to 60 lbs. Much larger units are made, too. Recently Pacific Telephone installed a diesel turbine as an emergency power plant on the roof of its Oakland, California, Franklin Street building, which houses telephone switching equipment.

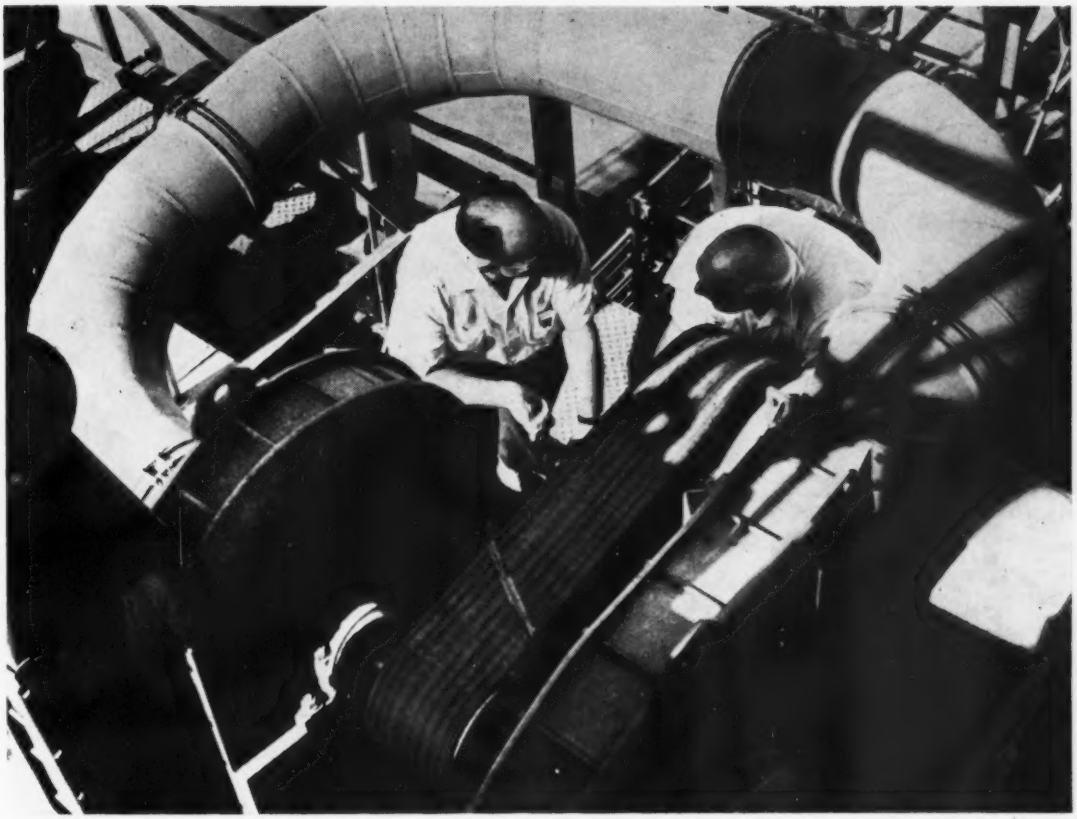
The compact power package, consisting of turbine, gear box and generator is light enough to be carried by three men, yet is capable of supplying communications power for a city of 70,000.

H. F. Schlarb, telephone company Power Staff Engineer, said the aircraft-type turbine will be used to power an emergency electric generator. In the event of any power failure, the unit will provide another emergency power source for continued operation of local and long distance switching equipment serving the entire East Bay.

Telephone company engineers supervising the installation said that the unit will add 750 kilowatts of electric power capacity to the existing 900 kw diesel-powered plant in the building's basement.

Its small size and light weight eliminate the need for expensive building alterations and for use of basement space that a diesel motor would require.

The 320-pound turbine was produced by General Electric. It burns regular diesel fuel. The whole unit including turbine, gear box and generator is not



INSPECTING installation of flat belt at Arizona Cottonseed Products, Gilbert, Ariz. Improved materials have caused increased use of this type of belt. The one in the photo is driven by a 100 hp motor and operates without slip at 9300 fpm. to drive a blower unit.

much longer than a compact car.

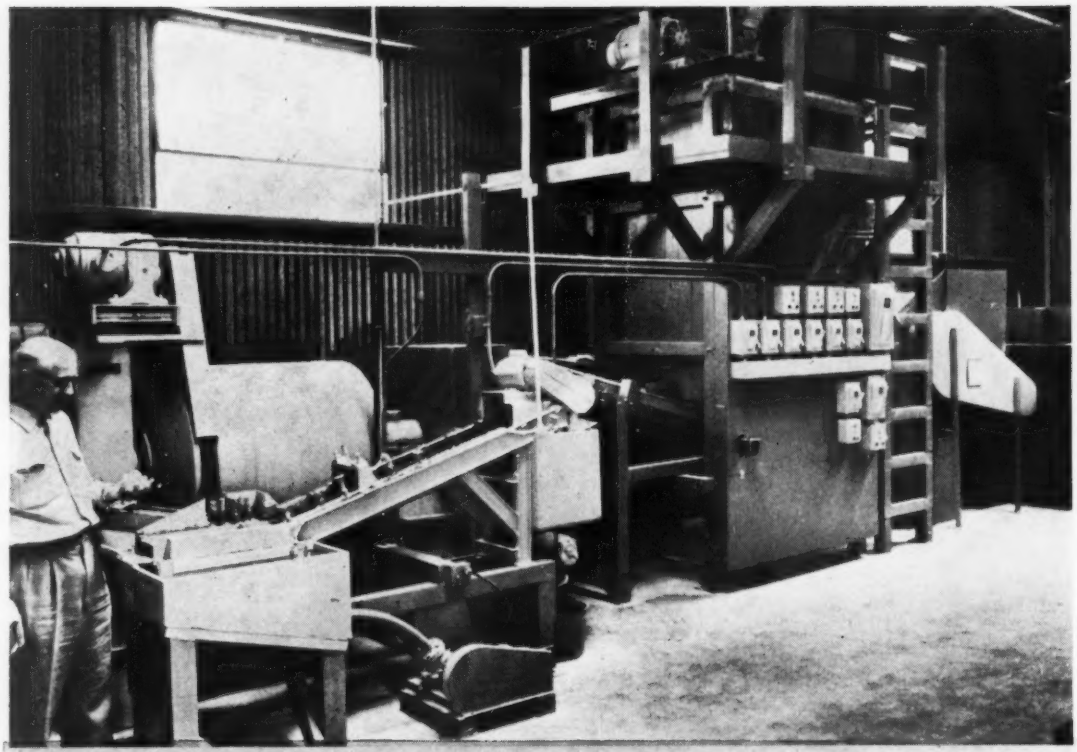
The GE Model 720 set weighs only 12,235 pounds compared to 43,100 pounds for its diesel generator counterpart, a 70 percent savings in unit weight.

MOTORS

Just as electricity is the major source of power for Western industry, electric motors are the standard means of utilizing this power. The electric motor is the most convenient, practical and inexpensive way to run machinery. There are a number of different types of motors, each of which has special qualities. The squirrel-cage induction motor is perhaps the most common. It comes in all sizes, is extremely reliable, provides a fairly constant speed and can be used with mechanical speed changers. Wound rotor induction motors require low starting currents and are used where smooth starting of high inertia loads are desirable. Synchronous motors are widely used by industry for constant speed drives. They drive machines that do not need to be stopped and started frequently. A variation of this is the synchronous induction motor, which starts up as an induction motor and needs no d-c excitation. After reaching full speed it operates as a synchronous motor. The d-c motor is seeing increased industrial use. Variations include shunt wound, series wound and compound wound. The shunt wound d-c motor is used for low inertial loads where constant speed is needed. A variation of this type is the shunt wound, adjustable speed motor, used in cases requiring moderate starting and adjustable speed loads, such as conveyors and machine tools. The series wound motor is for heavy starting loads where the speed varies inversely with the load. This is a good motor for cranes and hoists. The compound wound motor will handle pulsating loads and those where there is shock.

Fractional horsepower motors are found in an almost infinite variety of styles, types and sizes. In general, such motors are extremely rugged and reliable. These motors are the workhorses of industry. Some of the more widely used types are capacitor-start motors, split-phase motors, shaded pole motors, polyphase motors and universal motors.

Motors are typical of the entire field of power development; their improvement has been gradual, but constant. Motors generally are more rugged and dependable than ever before. They are also more compact and useful. The materials, both structural and magnetic used in motors are being improved.



PILOT PLANT for milling ore at Beryllium Resources, Inc., Huntington Park, Calif., is typical of trend to avoid common power source and install separate power units and speed regulation system for each power application.

Typical of this is the development of a "double oriented" silicon iron.

There are improvements in motor insulation too. Using the newer plastic materials, vital internal parts are coated and these motors are taking the place of the more costly totally enclosed motors in many applications.

MECHANICAL POWER TRANSMISSION

Western manufacturing plants, because of their newness, are probably more advanced in general applications of mechanical power transmission equipment than elsewhere in the country. Coupled with this newness is a Western trait of accepting and using new developments. Representatives of power transmission manufacturers are constantly alluding to it. When a new or somewhat different product is placed on the market, Western manufacturing men will accept and use it, if it offers cost savings. In the east, the acceptance of a new item of equipment is much more difficult.

The most important Western trend in mechanical power transmission is the increased requirement for flexibility in drive speeds. There are also trends towards compactness, maintenance free operation, and ease of installation and repair.

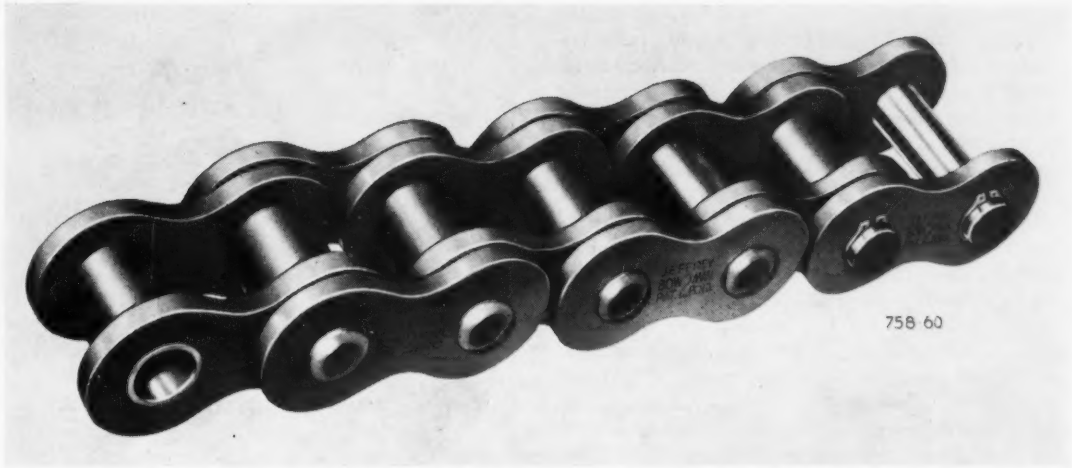
BELTS

The acceptance of the V-belt is almost as widespread as that of the fractional hp electric motor. These belts are the most used means of transmitting power. Their trouble free operation, low cost, easy installation and universal availability make them a prime power transmission tool. V-belts have constantly been improved by better production processes and newer and more varied materials.

A few years ago, the so-called "super V-belt" was developed. This belt, a combination of stronger materials, improved sheaves and other features, provides the same or more power as the standard V-belt in a much smaller belt. It allows use of smaller sheaves and fewer belts and gives the user space savings of 50% or better. In addition to greatly increased compactness, the belts generally last longer and, because of added strength, can be used to carry higher horsepower. The result is a sharply reduced application cost.

Another form of belting is Veelos belt. This comes in the form of individual links which are fastened together to form a V-belt. These belts, therefore, are adjustable and easily repaired by the removal of a single broken link. For installations where belts are sometimes broken or damaged due to outside causes, this type of belt can be a cost saver over the standard V-belt.

Similar to Veelos in one respect is the use of a roll of standard V-belting and special fasteners to form a belt. This method has the advantage of a plant being able to make its own belts immediately.



REDESIGNED roller chain is typical of type of improvements being made throughout power transmission field. Though basic product remains the same, Jeffrey, through design changes, has increased actual breaking load of chain some 58%.

Flat belts, which were on their way out, are now being used more, because of new materials which have greatly increased their strength and permitted them to be run at much higher speeds than formerly.

In one case, a flat belt replaced V-belts on driving a blower unit which provided pneumatic pressure to a 60-ft vertical air lift. The lift delivers cottonseed meal and grain to a feed mill for Arizona Cottonseed Products Co., Gilbert, Arizona. The belt used was a nylon-polymer core flat belt by Extremultus, Inc. The existing 100 hp, 1750 rpm motor was used in conjunction with a 20x8 in. drive pulley and a 10x8 in. driven pulley without further change to the system. The drive resulted in a belt speed of 9300 fpm and operated without slip to provide the power and speed required to maintain the required pneumatic pressure in the system.

Another type of flat belting, which is seeing increased use, is a synthetic fiber and plastic belt. The belt can be spliced together to form an endless belt that is light and extremely strong. These belts, by R. & J. Dick, are often used with fractional horsepower motors and operate at high speeds. Because of their resistance to humidity, oil, and acids, the belts have a large number of applications in the food processing and paper industries.

Timing belts are an excellent example of how one type of power transmission equipment is broadening its scope and gradually expanding to another type's area. For many applications belting is unsatisfactory. This is particularly true where a positive drive is necessary and no slippage can be tolerated. The timing belts are now used in some applications previously covered only by chain drives. They can operate in installations using 200 hp and at speeds from 15,000 rpm down to 1 rpm. These belts are especially suited for low to medium horsepowers and high speeds. Timing belts have applications in the lumber industry, and are often used as original equipment in business machines.

CHAIN

Chain drives have features that make them the logical choice for many power transmission applications. They are a relatively low cost means of handling slow speeds and provide positive non-slip power. In addition, chain is dependable and easily and inexpensively adjusted to different speeds by chang-

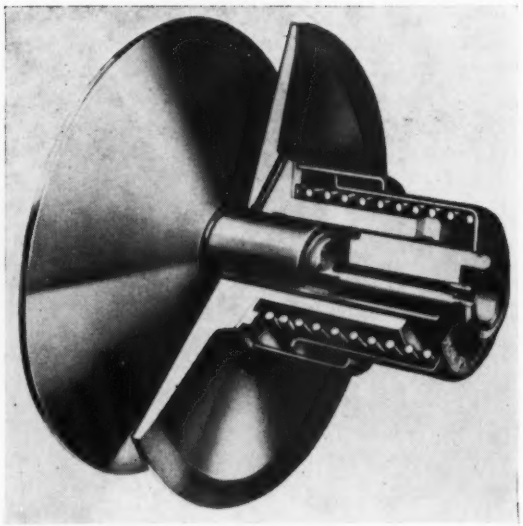
CHAIN DRIVE is used to provide power to a belt conveyor at Superior Alloy Co., South San Francisco, a stainless steel foundry. Conveyor transports foundry sand and Whitney chain is run dry at slow speeds. Cover shown in photo is a guard for safety purposes only.

ing sprockets.

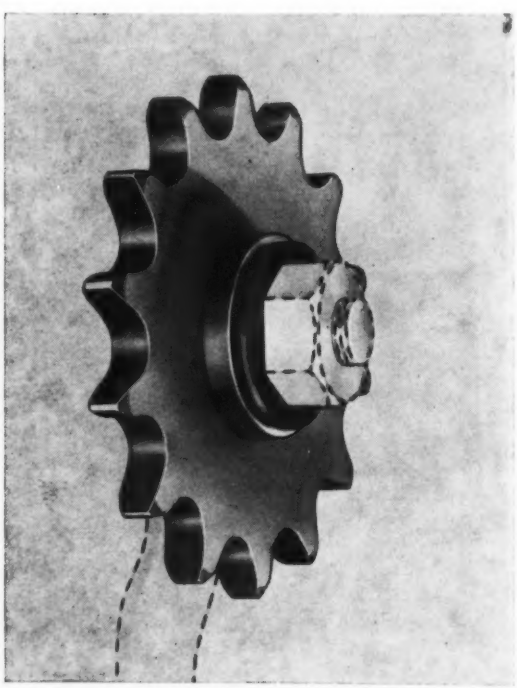
Roller chain and sprockets are steadily being improved. Recently the Association of Roller and Silent Chain Manufacturers announced new horsepower ratings which sizeably increased the horsepower capacity of roller chain. Much of this improvement is in the development of stronger, more lasting materials, better design and improved production techniques. Jeffrey Manufacturing Co., for instance, has redesigned their roller chain to produce a stronger chain requiring less adjustment and maintenance. Called Bowman chain, the new design has 40% fewer wearing surfaces, 39% greater bearing area and 66% more pin capacity. Other improvements in the field of chain are due to improved heat treating techniques.

With these improvements, we are seeing chain drives used for increasingly higher speeds. One problem particularly noticeable at higher speeds is lubrication. To achieve good lubrication, when needed, most applications require an oil bath housing. Recently, Whitney Chain developed a self-lubricating chain, which has at least partially overcome the lubrication problem. This chain has oil impregnated, sintered steel roller bushings. These serve as self-lubricating bearings. Another step towards solving the lubricating problem is pre-lubricated chains which are using increasingly better lubricants.

In the majority of cases where roller chain is used, it is run dry. At Superior Alloys Co., a South San Francisco stainless steel foundry, Whitney roller chain drives run lengths of conveyor belt and elevators used to handle foundry sand. Here a positive drive is required. The complete system of conveyor belts is interlocked and set up so, if there is a break, the entire system will stop. On one typical conveyor a 2 hp U. S. Electrical geared motor provides the power, and it, and the chain drive, reduce the speed to where the conveyor belt travels at 500 fpm. The chain is run dry and replaced when it wears out.



VARIABLE SPEED SHEAVE in cutaway view to demonstrate how it adjusts to desired width to achieve correct rpm from belt. This unit by Sterling Electric Motors has output speeds ranging from 2200 rpm to 141 rpm with a 3 to 1 speed variation utilizing 1750 or 1160 rpm motors.



IDLER SPROCKET by Diamond Chain comes completely assembled with bearing and saves procurement and installation time.

Besides being a low cost method of transmitting positive power, chain drives are very effective for moving heavy loads slowly. Douglas Aircraft Co., working with Link-Belt engineers has developed a retractable missile shelter for Thor missile installations. The shelter is used to house and protect the missile. When in operation, it is retracted on rails about 100 ft. away from the missile, allowing the Thor to be erected and made ready for firing. The missile is moved by means of a steel cable anchored at each end of the rail travel. The cable runs from one anchor to under the shelter, where it is wrapped around a steel drum and out to the other anchor. Two units of this type are used in case of breakdown. The drive is mounted on the underside of a fabricated carriage assembly and consists of quadruple width roller chain and sprockets, self-aligning roller bearing pillow blocks, geared flexible couplings, heat treated cast steel drums and heat treated shafting.

PULLEYS, SHEAVES & SPROCKETS

There have been improvements in all three of these items. With pulleys, the use of ductile iron has permitted flat belt speeds much higher than were previously attainable and provided a pulley that will

withstand these speeds.

The development of the super V-belt is partly the result of sheave improvements in design and manufacture. Of special interest to Western plants are variable speed sheaves. These units, while not new, are constantly being improved, and are an inexpensive method of effectively changing speeds for applications using less than 25 hp. The sheaves are adjustable in width, and rpm variations achieved in direct ratio to the depth at which the belt rides in the sheave. The simplest form consists of a manual unit which can be adjusted on stopping the drive. Other more sophisticated types adjust automatically, according to load, or can be adjusted manually while in use. While standard V-belts can be run with these sheaves, special variable speed belts are available. As an example, Lovejoy Flexible Coupling Co. has recently developed a belt of this type which is designed to withstand the intense squeezing action of the sheave walls.

One problem connected with variable speed sheaves is fretting corrosion or the locking of the sheave when it has run at one speed continuously or stood for a period of time. However, improvements are being made here and this has been largely overcome.

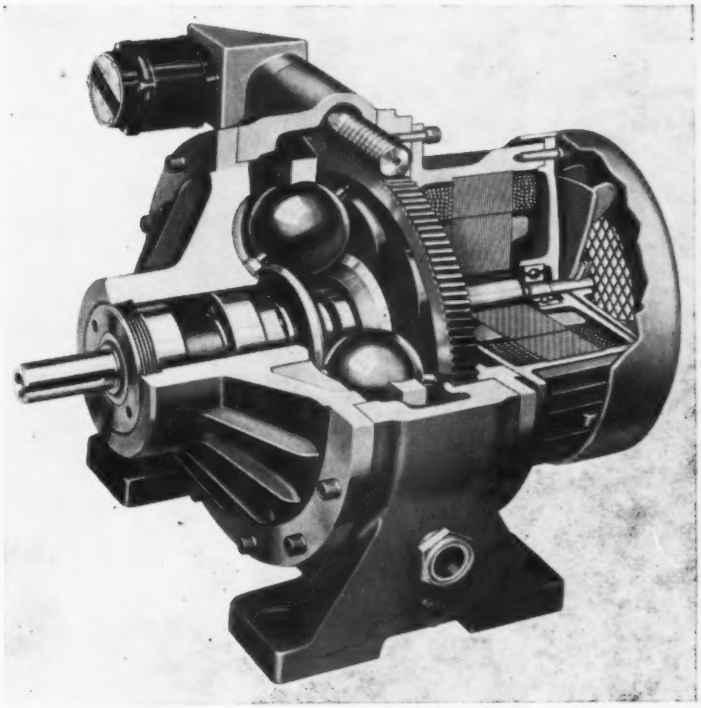
In general, the applications, which are suitable for the type of variable sheave that must be stopped for adjustment, are those where infrequent adjustments are made. Typical of this would be a fan which is run at two different speeds, one for summer, and one for winter. For constant speed changes and changing while running, the more intricate types are needed.

Sprockets receive considerable wear in chain drive installations. Improvements here have been in better materials and improved hardening. Like chain, sprockets are being made tougher and longer lasting. Diamond Chain has come out with a new idler sprocket which is equipped with an oil impregnated bearing and comes fully assembled to simplify installation. A development by Chain Belt is segmental rim sprockets. Here the heat treated sprocket rims are bolted to the sprocket body and shafts and bearings do not have to be removed when changing sprockets.

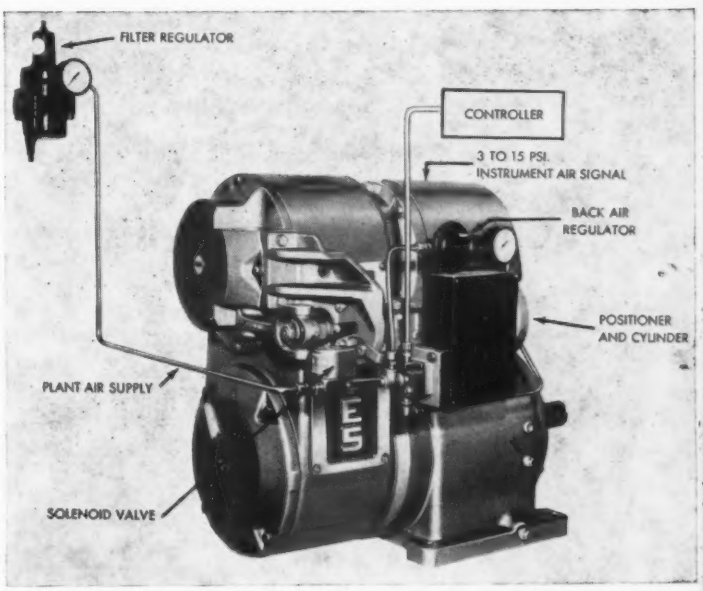
VARIABLE SPEED DRIVES

In the field of power transmission, this area of variable speed drives is probably the one showing the greatest future possibilities for Western manufacturing plants. These drives and the control systems that can be incorporated with them are a relatively inexpensive method of providing more flexibility and making production equipment and processes more automatic. As such, they are another, at least, partial solution to the needs of many Western manufacturers. Since Western manufacturing is seldom automated due to limited production, its problem is to become more automatic at a reasonable cost, yet at the same time remain flexible in production.

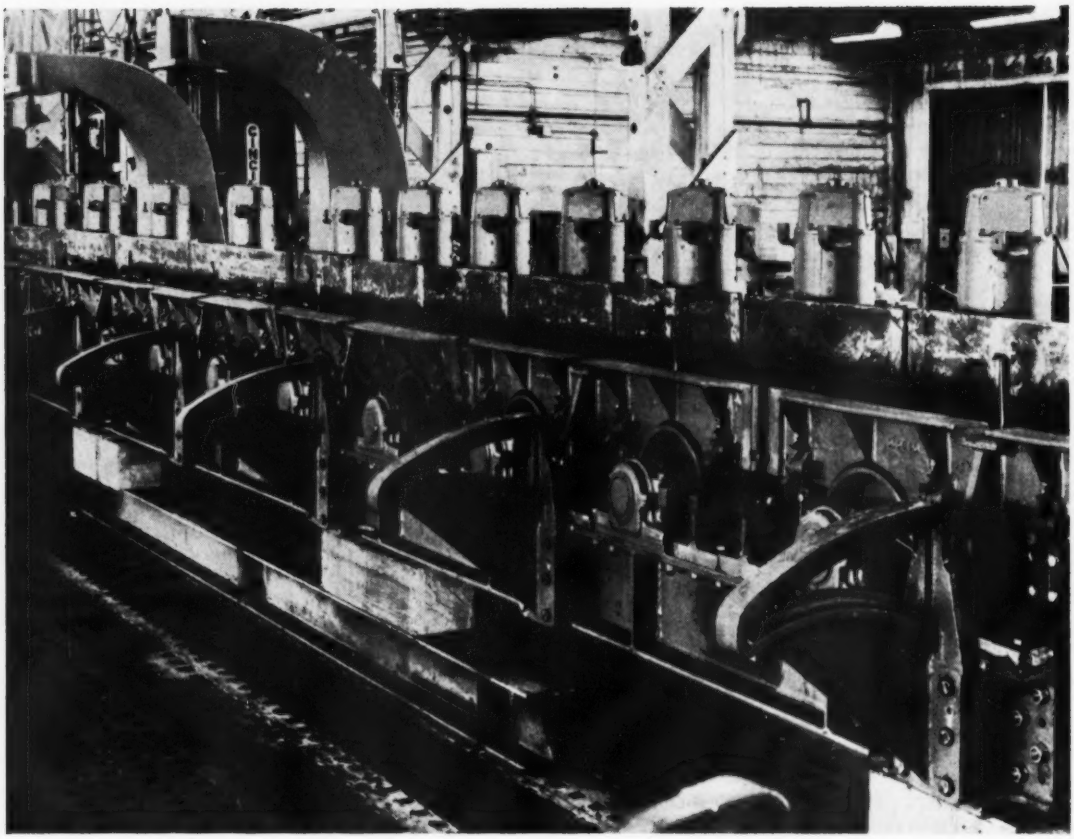
There are many types of variable speed drives made. The simplest ones are mechanical and based upon the use of a variable speed sheave or sheaves. Where a single variable speed sheave is used, speed variations are accomplished by placing the motor on



CUTOUT VIEW of Cleveland Speed Variator with integral pancake motor. Unit is used at American Latex Products Corp., Los Angeles, in their urethane foam manufacturing process (see cover photo). This type of variable speed drive is capable of precise control needed for the application.



NEW PNEUMATIC system controls machines and processes by automatically regulating and changing drive speeds. Called AIRtrol, by Reeves, it works on shop air lines and employs a measuring device, controller, pressure regulators and solenoid valves.



TWO HORSEPOWER standard d-c vertical flange mounted motors are shown positioned above Western Gear BSM-102 shaft mounted roll drives of new design. The equipment, an 86 ft. back shear table developed for Bethlehem Steel, has 27 drives, each individually powered, that can be replaced in minimum downtime.

an adjustable base and moving it. The control is either by hand or automatically.

These drives are enclosed in a housing and can be used as a unit. While such drives usually come in fractional or small horsepower sizes, there is a trend to larger sizes. U. S. Electrical Motors makes its Varidrive in sizes up to 100 hp.

An example of how this type of variable speed drive can be used is found at Beryllium Resources Inc. In the West where electricity is a reasonably priced operating commodity, plants have a tendency to avoid common power sources and to install a separate power unit and speed regulation system for each power application.

This is particularly evident in a number of process industries that must operate rotary equipment such as dryers, calciners, tumbling units, crushers, ball mills and conveyors.

An interesting case in point is the recently constructed pilot plant of Beryllium Resources, Inc., Huntington Park, Calif., which is separating valuable beryllium from less valuable residues by a flotation system.

This consists, basically, of a containing cell and a continuously flowing supply of finely ground ores, water, air and chemicals. Chemicals act to effect a preferential separation of mineral particles in the finely ground ore by causing selected particles to be bouyantly floated by means of attached air bubbles from the dilute pulp slurry formed by mixing ground beryllium ore with water.

Long before the chemical processing, ore must be crushed and transported for fine grinding and size classification. This involves a conveyor system that must feed the crushed ore to a ball mill in carefully controlled quantities. The mill itself must operate at specific speeds to regulate the particulate size of the ore.

Found ideal for these applications were electric motors transmitting power via V-belt to machinery.

A ¾ hp US Electrical Motor Varidrive unit powers the positive belt feeder conveyor that brings finely crushed beryllium ores from a storage bin to the ball mill.

The Varidrive transmits power via V-belt to a cam that raises an arm to activate a ratchet-driven roller that moves the conveyor belt. Ore is tumbled off the end of the conveyor at a rate of 1.25 lbs. per minute and can be discharged at 10 times that speed if necessary.

Ore is fed to a 3-ft. by 4-ft. steel shell ball mill which operates off of 4 type B-144 V-belts powered by a 3 hp, 155 rpm Sterling Electric Motor. Ball mill speed is approximately 30 rpm.

In the ball mill, ore is finely ground and is discharged to a spiral classifier in the form of a slurry. The classifier only allows ore of the correct particulate size to continue on through the plant system.

The classifier, consisting primarily of a metal horizontal screw conveyor, is powered by an electric motor and an Eberhardt Denver 4-speed belt operated by variable speed drive. A Moyno pump propels the slurry from the classifier onto the next processing station at about 1.1 gpm. The pump is a cradle mounted progressing cavity type.

Another type of variable speed drive is one which works on the principle of the angular positioning of a drive ball in contact with a drive disc. Made by Cleveland Worm & Gear Div., Eaton Manufacturing Co., it is infinitely variable over a range of 9:1, and unit sizes range from fractional to 15 hp.

Under a constant imposed load, the input and output speed ratio is steady, and the unit will operate for hours without variation. The Speed Variator is capable of extremely precise changes in speed and is used extensively in the chemical processing industry. The American Latex Products Corporation of Los Angeles is a typical user. The metering of resins, catalysts and other mixing agents is critical to its urethane foam manufacturing process. Variators control the pumping speed of each liquid to a nozzle (see cover photo), which pours the mixture onto a slow-moving, inclined conveyor. Within 10 feet, the mixture has risen into a 28 x 60-in. "bun." The "Bun" continues to flow down through a curing oven to the end of the processing line. Here it is cut off into sections as much as 50 feet long.

Still another type of variable speed drive uses roller chain that rotates over opposed conical wheels.

Variable speed drives are controlled in a number of different ways. The simplest and most common is by means of a crank or lever on the outside of the housing. This is sometimes used in connection with an rpm dial and pointer so that by turning the crank one can literally dial the desired rpm.

The drives also can be remote controlled. A mechanical remote control consists of extending the hand crank method by using a flexible shaft and cable assembly. Another remote control method is pneumatic. Reeves Pulley Div., Reliance Electric and Engineering Co. has developed a low cost pneumatic system that operates from the plant air.

To achieve high accuracies, a variable speed drive can be used to power an a-c alternator. By varying the a-c frequency of the motors connected to it, synchronized speed changes are accomplished. Louis-Allis Synchro Range drive is an example of this method.

Another more expensive method of achieving variable speeds is by converting a-c power through a rectifier into d-c. Eddy current or electromagnetic couplings transmit the power to the driven elements. This method is particularly effective since there is no wear and speeds can be varied rapidly in an infinite stepless manner. In addition, there is no limitation in horsepower size.

SELF-ALIGNING and self lubricating sleeve bearing in a pillow block will operate in temperatures up to 1000 deg. F., under corrosive conditions or in inaccessible areas. These new bearings developed by Link-Belt are an example of trend towards eliminating maintenance.

Accurate control and spotting speeds with a minimum of maintenance is achieved by an a-c reactor type control installed in recently completed dockside cranes at the Port of Anchorage, Alaska.

The two 40½-ton capacity, and two 7½-ton capacity traveling, revolving-type Gantry cranes were designed and constructed by the Washington Iron Works, Seattle, Wash.

Westinghouse wound-rotor 440-volt, 3-phase crane and hoist-type motors with Class A insulation and special powerhouse moisture resistant treatment are used throughout the drive system with strip heaters that prevent condensation during off periods.

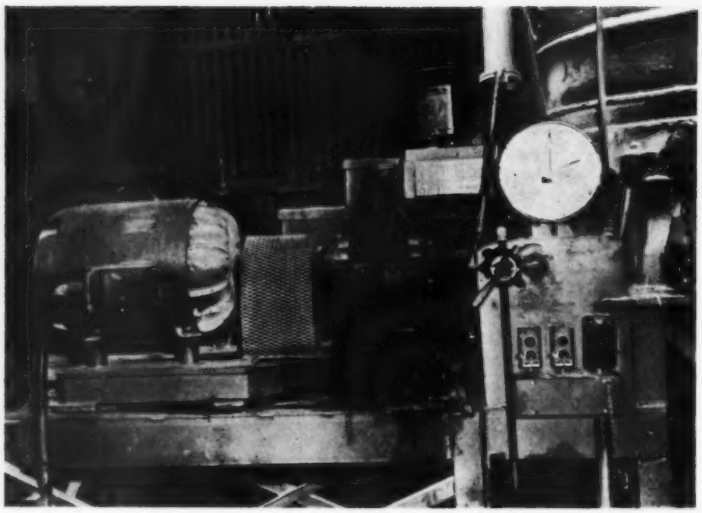
Static reversing and stepless speed control is provided on the main, auxiliary, and luffing hoists by full magnetic reversing, variable reactance, controls, without load detector. The static motor reversing is accomplished by operating the saturable reactors in pairs like two-pole reversing contactors. All secondary contactors and relays are eliminated, and stepless speed control is available over the entire range.

The Load-O-Matic control system, through the total elimination of contactors and accelerating relays, requires minimum maintenance, while providing easy-to-understand and operate crane control.

Hydraulic drives are also a means of variable speed transmission. Using a combination of a variable displacement pump and motor to drive an induction motor, an unlimited range of drive combinations is available.

GEAR REDUCERS

Gear reducers are still the most dependable method of power transmission for many jobs. Among



TYPICAL of installations where herringbone gear speed reducers are used is one at Superior Alloy Co. Here a 25 hp G. E. motor runs a muller. Speed reduction is through Falk herringbone gear unit that tends to equalize directional thrust.

the improvements made in this area have been better gear hardening techniques, increased strength and more compact design. Gear reducers are following the general industry trend towards compactness. One indication of this is a recent poll conducted by Cleveland Worm and Gear Div., Eaton Manufacturing Co., which showed that users were interested in saving of space and baseplate complexity and desire a power transmission unit in which the reducer and the motor are combined into a single unit. Another example of this trend towards compactness is the increased use of shaft mounted reducers, which are extremely space saving and require no mounting. It is also interesting to note that ductile iron is being used for some reducer housings. This material has a strength of approximately 60,000 psi as against 32,000 for semi-steel and 22,000 for grey iron castings. Its use will allow either a stronger housing of the same thickness or a lighter housing, having the same strength.

Standard types of gear reducers include worm gear, bevel gear, helical and herringbone. Each have special qualities and are used for applications calling for these particular qualities.

One of the problems commonly associated with operation of steel bar mills is the necessity for a two or three-inch excess allowance to compensate for cutting equipment inaccuracies.

In this regard, new levels of precision and reliability, resulting in cost savings during production of small to medium-sized structural steel bars, have been reported through use of an 86-ft. back shear table developed by Industrial Products Div., Western Gear Corp., Belmont, Calif. for Bethlehem Steel. Already operating, the shear table is cutting 60-ft. lengths to an accuracy of ⅛-in.

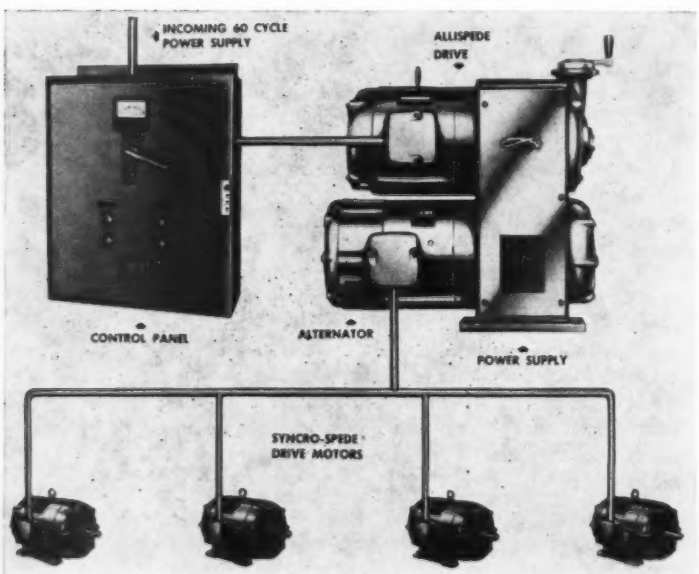
Individual Western Gear BSM-102 shaft-mounted gearmotor drives mounted on the 27 conveyor rolls of the shear table provide the simplest possible form of drive and assure relative ease of maintenance as individual units can be replaced in minutes.

The units use spiral bevel gears, eliminating the possibility of gear locking. Teeth are hardened for maximum life and heavy duty bearings support all gear loads. Drives are powered by 2 hp standard DC vertical flange-mounted motors.

Three shear gauges are furnished with shock-absorbing air cylinders to reduce hammering effect of bars hitting the gauge plates. They are equipped with hand adjusted vernier scales for accurate cutting to 1/16-in. They also are designed with a 16-in. clearance above the conveyor with the stop plates in raised position, a feature that minimizes danger of warped bars hitting the gauge carriers.

Skew conveyor rollers serve to keep moving bars against the fixed side guard aprons. On the open side of the conveyor, quick-acting, disappearing side guards allow the conveyor itself to be used as a transfer table, if required.

Sideguards also interlock with the transfer arms, retracting when the arms are actuated. This permits use of the guards when cutting bars to length and also tend to prevent warped items from drifting off the table.



SYNCHRONIZING speeds of a number of motors is accomplished by Louis Allis system that uses synchronous drive motors and adjustable frequency power. While speeds can be varied, all motors maintain identical speed.

REDUCED chain breakage and longer belt life is the result of installing a Flexidyne dry fluid drive on the shaft of a 20 hp, 1750 rpm motor. Installation is at U. S. Plywood Corp., Anderson, Calif. and is used to provide power for its main log haul.

Kick-off arms, line-shaft driven via a Western Gear SpeedMaster parallel shaft herringbone speed reducer, are spring loaded and impossible to jam in use. They also disappear on the return stroke. Overall construction of the table is of heavy steel castings and weldments.

Other examples of gear reducers are found at Superior Alloys Co., South San Francisco. This foundry uses a Simpson muller to mix foundry sand. The muller is run by a 25 hp GE motor driving through a Falk 600A herringbone speed reducer. A worm drive cannot be used here because there is too much friction. Spiral gears, because of thrust, tend to move in one direction and wear out. The herringbone gear, however, equalizes the thrust. The heavy starting load also tends to wear teeth rapidly. Herringbone gears have an advantage in that, when worn, they can be turned over and the other side used. This is a case where a herringbone gear reducer, while it is more expensive, will cost less, since it will give better service.

The shaft mounted reducer is one of the more recent advances in this area of power transmission. Its main advantages are ease of installation and compactness. It is a relatively simple matter to install a unit on the drive shaft. The fact that no base is needed permits installation in many cases where it would be difficult to install a base mounted reducer. In addition, the installation takes considerably less space. Because of these advantages, there is often a cost saving aspect in the installation of a shaft mounted reducer.

Gearmotors are a reliable and effective way to transmit power. They can be sealed to run efficiently under almost any conditions and at the same time provide a compact, long lasting unit. One reason why gearmotors are preferred in many applications is that they require little maintenance.

A gearmotor trend is away from integral units, where the motor and gears are a custom-fit. Manufacturers such as General Electric have developed a product where standard motors and gear components can be coupled together. These have most of the advantages of integral gearmotors and cost considerably less.

CLUTCHES

Clutches are extremely important in power transmission in that they are a means of controlling the application of power to a process. Clutches of the mechanical type operated by friction have many applications. With the increased demand for higher speeds and instantaneous action, a number of other types of clutches have come into prominence. These include fluid, air and electric clutches.

Fluid clutches are well suited for starting heavy loads since they give soft starts and provide slippage in case of jam or overload. An example of the use of this type of clutch is at United States Plywood Corporation, Anderson, Calif. Chain breakage was frequent and belt life short before the firm installed a Flexidyne dry fluid drive on the shaft of the 20 hp, 1750 rpm motor for its main log haul.

The dry fluid unit transmits power from the motor through a multiple V-belt drive to a Dodge Torque-Arm speed reducer to operate the chain conveyor. Because Flexidyne allows the motor to start freely under no-load condition and develops torque gradually, it has reduced strain on the motor, lowered chain breakage and increased belt life, according to the plywood company's maintenance engineer.

The clutch consists of a housing, connected to the motor and containing a measured amount of heat treated steel shot. When the motor is started, centrifugal force throws the flow charge to the perimeter of the housing, where it engages a rotor to transmit power to the load.

It performs at 100 per cent efficiency and without slip after achieving full running speed. Torque can be tailored to requirements by varying the amount of flow charge used.

Air clutches such as the Fawick Air-flex unit give the user precision stopping, safety and low maintenance costs. They are adaptable to auto-

matic systems and have remote control quickness. These clutches are often used in the paper and plywood industries.

The electric magnetic clutch, though expensive, is extremely versatile and long lasting. It provides quick operation with almost instantaneous torque transfer. This type of clutch should have increasing use in Western plants.

COUPLINGS

Couplings not only join two shafts but in many cases are used to compensate for any misalignment that might occur. Among the types used are rigid couplings, universal couplings and flexible couplings. Flexible couplings are of various designs. Some use gears, others chain, and still others use rubber.

Driving a Banbury mixer at different speeds by using two powerful motors alternately presented an unusual problem at the Burke Rubber Company, San Jose, Calif.

A simple and inexpensive solution was found in mounting two Dodge Para-flex flexible cushion couplings on the shafts of the two motors which drive the mixer through a pinion bull gear.

One motor is rated at 75 hp at 420 rpm. and the other is 125 hp with speed of 585 rpm. The mixer is required to operate 16 hours per day, six days a week.

Roger Theiss, the plant engineer, reports that his crew saved 30 man hours on installation time alone by using the rubber tire couplings with Taper-Lock bushings instead of conventional gear or grid-type couplings where a sweat fit is standard. In operation since March 1, 1959, these couplings absorb end float of the sleeve bearing motor shafts, eliminate excessive thrust on the bull gear pinion shaft, and have been found to be an inexpensive method of achieving two-speed mixer performance.

The couplings also absorb shock when changing speeds, and introduce a safety element in the event that electrical circuit failure should permit both high and low speed motors to engage at the same time.

HYDRAULIC & PNEUMATIC

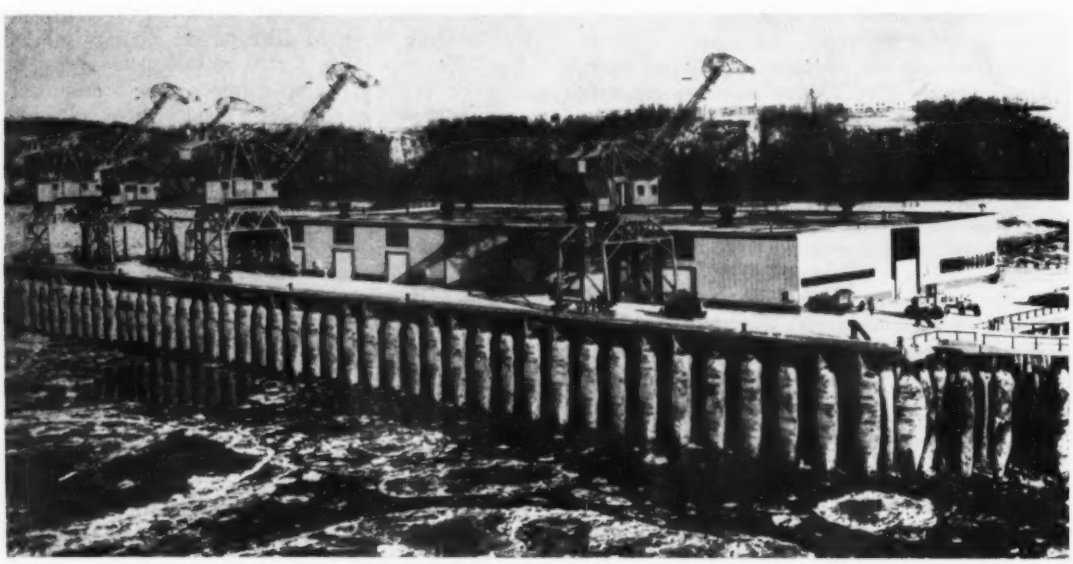
Hydraulic power use in the West is increasing. For many applications a hydraulic system is the only type of power that can be used. Hydraulic power is fast, smooth, and can concentrate an extremely high output of power per square inch. In addition, there are certain safety features because piping or hose is used between the pump and work cylinder instead of mechanical equipment.

On hydraulics, the West, engineering-wise, is slightly ahead of the rest of the country. Many Western engineers are familiar with hydraulics because of extensive work and development programs in the aircraft industry.

Closed hydraulic systems are composed basically of a pump, valves, reservoir, work cylinder or motor, pipe or hose and fittings. To this is added a filter. These systems have low maintenance costs, are self lubricated, and flexible in application. Most systems are made for one individual piece of equipment and are usually an integral part of it.

Examples of hydraulic power applications include presses, grinders, lifts, and fork lift trucks. Hydraulic equipment on the hoist mechanism of a lift truck is a natural application for this type of power. Here hose is used because of the need for flexibity due to motion of the lift.

Where hydraulically operated equipment is used near extremely hot areas there is sometimes a safety



DOCKSIDE CRANES at the port of Anchorage, Alaska, are accurately controlled by a Westinghouse Load-O-Matic system. The cranes, built by Washington Iron Works, Seattle are of two sizes, 40½ ton capacity and 7½ ton capacity. Power system provides stepless speed control and static reverse.

ELECTRIC DRIVEN, air cooled Ingersoll Rand air compressor supplies air for complete plant system at Superior Alloys Co.

two types of power tend to complement each other.

Compressors are the heart of any pneumatic system. Improvements here are towards compactness, improved operation and a minimum of maintenance. Other improvements are in reduced vibration and better heat dissipation, found in today's compressors. There is a trend toward the use of rotary type compressors since these have fewer moving parts and low maintenance overhead.

Pneumatic power, unlike hydraulic, usually has a central source which services a number of applications. In most Western manufacturing plants, the plant air system runs a wide variety of equipment. An example of this is at Superior Alloys Co., South San Francisco. Because of the problem of dust and sand in the foundry building, an Ingersoll-Rand air-cooled 210 cu. ft. per min. air compressor is housed in a shed connected to the building. The unit is driven by a 50 hp GE electric motor, and equipped with a Westinghouse electric starter. Also in the shed is a pressure tank. This compressor furnishes compressed air for the entire foundry. An air line high on the side of the wall makes a complete loop of the building. The line is sloped so that moisture can be drained out of a common point and stand pipes come out of the top of the main pipe to prevent moisture pick up. The equipment working off this compressor includes: three pneumatic molding machines; one core machine; one shell molding machine; a sand blast; and a number of pneumatic hand grinders and chipping guns.

This type of power is particularly suitable for Western plant use since it is a good means of making an operation more automatic at a reasonable cost.

problem. This is especially true when the hydraulic installation requires use of flexible hose, rather than piping. Extreme heat can weaken, break, or set the hose on fire. Hydraulic oil in turn is flammable and a spray of flaming oil is a dangerous fire hazard. At the Mineral Products Division, Modesto, California plant of FMC Corporation (formerly Food Machinery and Chemical Corporation), operations require a fork lift truck to periodically approach very close to high temperature barium oxide furnaces, where the heat is intense. To solve this problem, the gasoline powered Towmotor fork lift truck has been equipped with 1532 Aeroquip fire resistant hose lines and fittings. A non-flammable hydraulic fluid is also used.

Hydraulic pumps are classified as constant displacement or variable displacement. Types commonly used include vane, screw, gear, reciprocating and rotating piston pumps. The pump is the key part of any hydraulic system. The trend here is towards dependability and standardization.

Pneumatic power while similar to hydraulic is not usually competitive with it. Pneumatic applications are often achieved at a relatively low cost, usually under that of hydraulic applications. While costing less, pneumatic power lacks some of the qualities that cause hydraulic power to be used for large highly permanent installations. As such, the

LIFT TRUCK operates close to high temperature barium oxide furnaces at Mineral Products Division, FMC in Modesto, Calif., causing safety problem on hydraulic hose that operates fork lift. Truck is now equipped with Aeroquip fire resistant hose and fittings and uses non-flammable hydraulic fluid.

TINIUS OLSEN

The standard Charpy V-notch specimen is pre-cooled to a minus 10°F. and secured in the tester. A heavy pendulum weight is then dropped through an arc to strike the weldment. Many of the Easyarc 328 coupons stopped the pendulum cold — as shown both at the left and in the closeup view at the right, photographed at the moment of impact.

Airco's NEW class E-7018 electrode stops Charpy tester cold!

EASYARC 328—iron powder, low hydrogen electrode for mild steel

Welds made with Airco's new Easyarc 328 give you outstanding impact strength in all approved applications. The dramatic test results achieved recently in the widely used Charpy test show why—

Typical industry requirements call for a Charpy V-notch value of 20 ft.-lbs. at minus 10°F for welds made with E-7018 electrodes.

Put to this back-breaker test, the new Easyarc 328 chalked up 190 ft.-lbs. average! Many coupons stopped the sledgehammer blows of the Charpy impact tester cold!

Consider also the other plus values of Easyarc 328—Excellent usability in all positions . . . High rate of deposition . . . Low spatter . . . Easy slag removal . . . X-ray quality welds . . . Works with either AC or DC reverse polarity.

Where Easyarc 328 will help you weld better — On low alloy high strength steels . . . Hardenable steels . . . High carbon steels . . . High sulfur steels . . . Enameling steels.

Here is a "natural", too, for industrial piping, and restrained joints in thick sections of mild steel.

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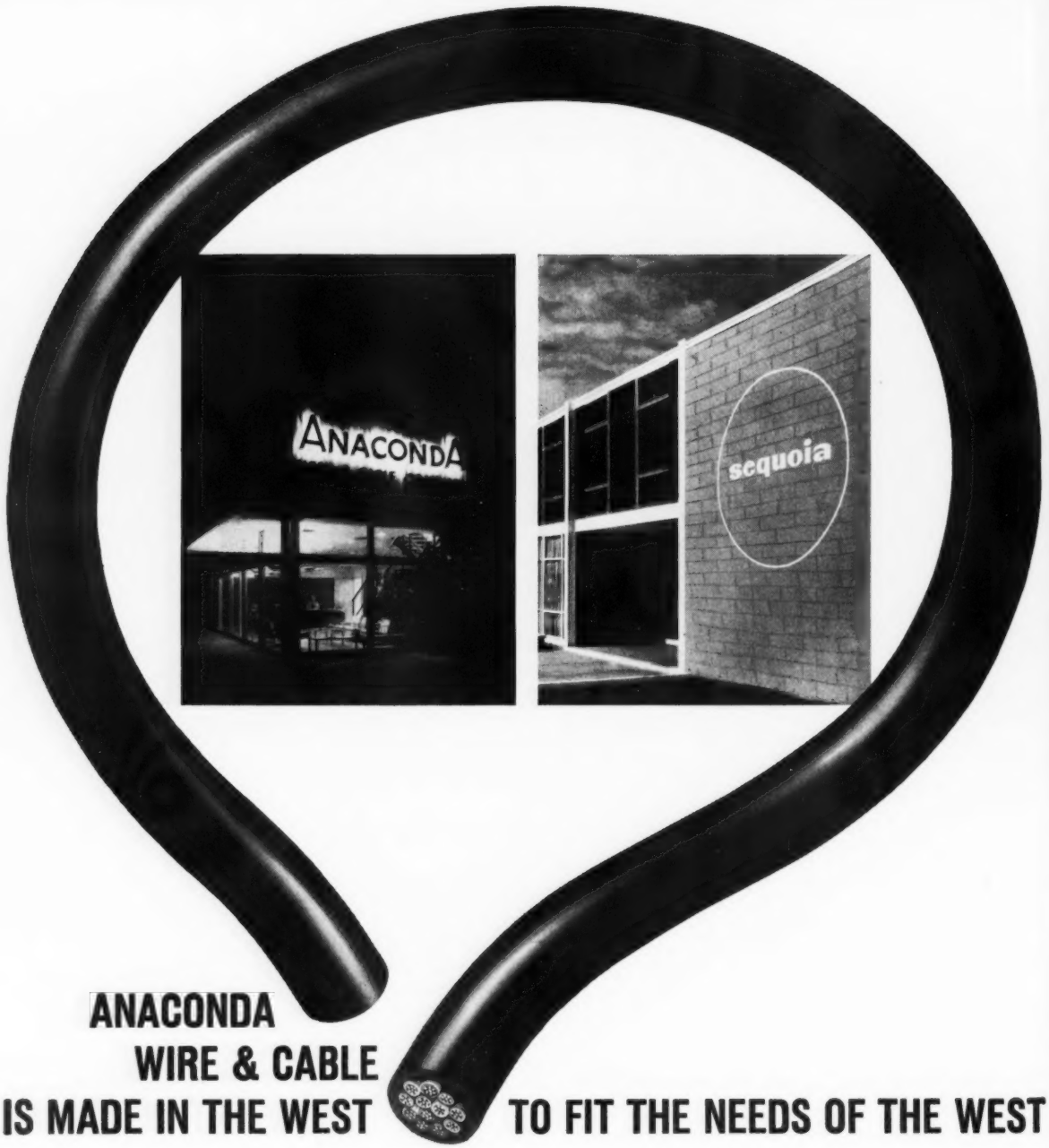

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Western MANUFACTURING

SEPT. 1961

VOL. 26 NO. 9

"By establishing an integrated facility in the dynamic Southern California area, Soule is in an enviable position to capitalize on future Western growth." EDW. L. SOULE, Founder and Chairman of the Board, Soule Steel Company.

INTEGRATED MANUFACTURING
is this a coming western trend

An experienced Western firm recently integrated its manufacturing facilities. Why it did so is important, since this action could point up a trend in Western manufacturing methods.

IN APRIL of this year Soule Steel Company completed the last phase of a program to fully integrate its Long Beach, California plant facilities. The firm, a manufacturer of metal building products and a major fabricator and erector of steel and reinforced concrete structures, now makes and fabricates all of its own reinforcing bars, ⅜ to 2½-in. in diameter, by the rolling mill, then fabricated according to job requirements and shipped directly to construction sites for erection.

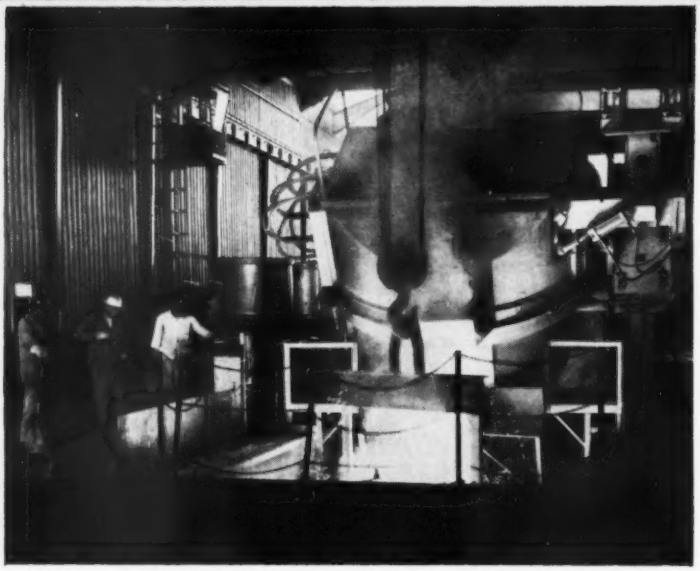
Soule Steel's new integrated manufacturing facility is the result of many years of growth and expansion for the company. Significantly, it was completed during the 50th anniversary of the company's founding. The firm's history of expansion closely parallels and is part of Western manufacturing growth. As such, its decision to integrate represents an important management decision made by an experienced Western company.

This typically Western firm was founded in San Francisco in 1911 with a staff of two. It grew, acquired other companies, merged with them and expanded. Soule Steel currently operates six plants, two in Southern California, and others in San Francisco, Seattle, Portland and Phoenix. It now employs 1600 persons.

Obviously, Soule executives feel that both they and the industrial West have progressed to the point where integrated manufacturing facilities are important to Soule Steel's future.

There are several factors underlying the company's decision to build an integrated rolling mill and fabricating plant for producing reinforcing steel bars. The principal factors include:

1. **Opportunities for market growth.** Soule's half century of growth has paralleled the rapid growth of the West. By establishing an integrated facility in the dynamic Southern California area, Soule is in an enviable position to capitalize on future Western growth, particularly as it pertains to the construction industry. Of special significance are the vast highway programs, either planned or currently under way, and the trend toward high rise buildings. These portend a substan-



INITIAL STEP in production of high quality reinforcing bar at integrated Long Beach, Calif. plant is melting of steel scrap in this electric furnace.

tial increase in concrete construction, and a corresponding increase in the use of reinforcing bars.

2. **Source of Supply.** Without an integrated facility, a company must rely on outside suppliers for the necessary materials to manufacture a finished product. As a result—and through no fault of its own—the company is frequently confronted with shortages and with costly delays in the manufacturing process. An integrated facility, on the other hand, has provided Soule with a dependable and continuing source of supply. This is a prime requisite to efficient and economical production.

3. **Quality control.** Soule's integrated facility has enabled the company to control each step in the production process. This, in turn, facilitates the production of a top-quality product.

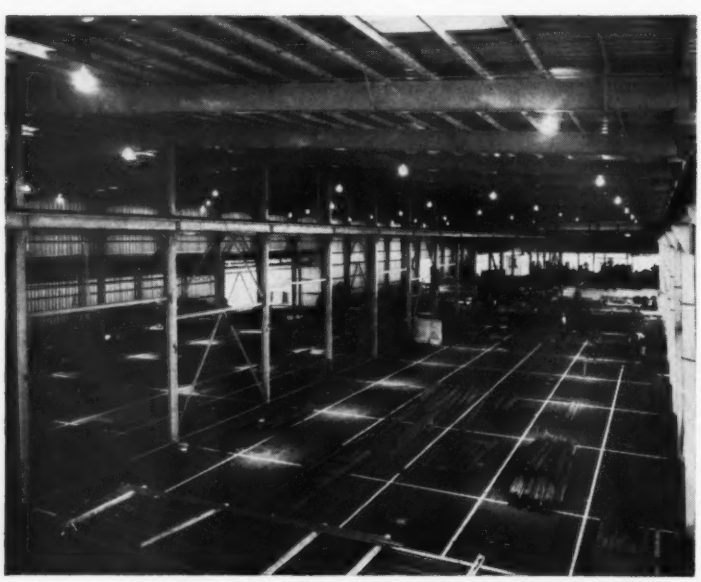
4. **Customer service.** Control over all phases of manufacturing enables Soule to turn out products which are exactly suited to customer requirements. It also facilitates proper production scheduling and prompt deliveries to customers.

5. **Base for expansion.** By integrating its reinforcing bar facilities, Soule has provided a broader base for future company expansion and for further additions to its product line.

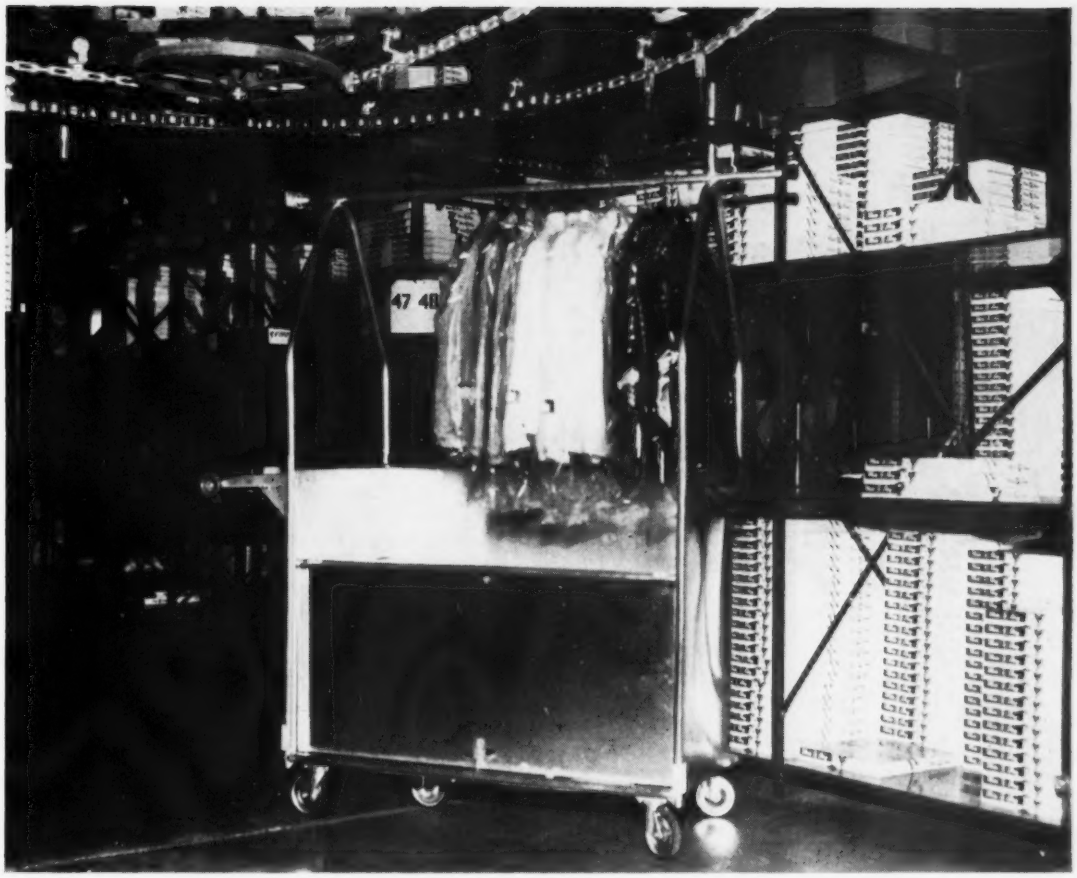
6. **Lower production costs.** The establishment of an integrated facility in a single location has reduced material handling costs and enabled Soule to achieve greater speed and efficiency in its entire reinforcing bar manufacturing operations.

Manufacturing men in the West are fully aware of the region's rapid industrial growth. They have seen countless new companies start and even new industries spring up. Despite this growth, few Western firms are integrated in their manufacturing. The manufacturing process in the West has been separated, often to the point where all parts for a manufactured item are subcontracted to a number of individual companies. The parent firm then assembles the product. Soule Steel's action, a change from the ordinary, demands careful consideration from other manufacturing firms.

What is important is that Soule Steel's management believes the company's future growth will be improved by integrated facilities. Since some of the reasons for this action are general ones, what is true of Soule Steel might well be true of other firms. If so, Soule's action could indicate the start of a gradual change in manufacturing methods by a number of Western companies. Whatever the case, one point is obvious: Soule Steel's management, in its 50 year history, has made few if any wrong decisions.



INTERIOR VIEW of new fabricating plant, part of Soule Steel's integrated facility. Fabrication is done in two bays, each 60 ft. wide and 440 ft. long.



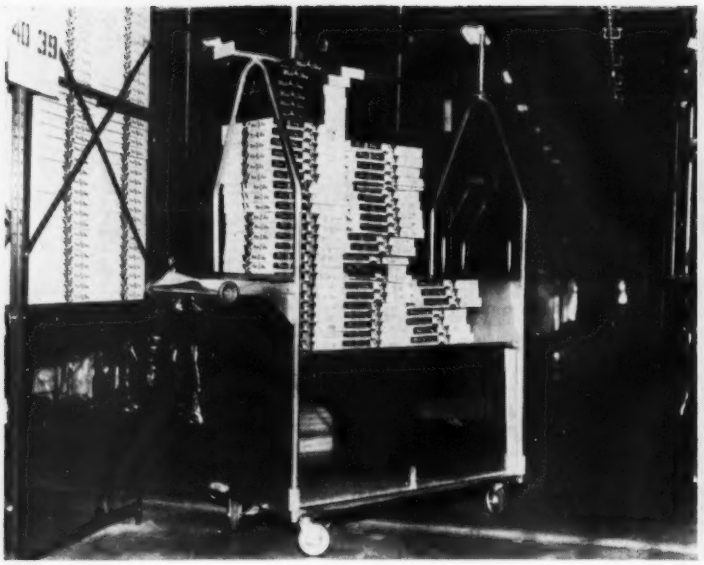
HANDLING TRUCK was specially designed for multi-purpose use. It, as shown on photo, can be attached to overhead conveyor system, or disengaged and pushed by hand through stock department to pick up order.

MECHANIZED WAREHOUSE cuts shipping costs 42%

One new installation does the work of two and allows this Western apparel firm using a Portland, Ore., shipping point, to compete favorably with eastern firms in an industry where order shipping speed is critical.

by K. Dean Vought
Executive Supervisor
Kurt Salmon Associates

MANUFACTURERS in the fast-moving, fiercely competitive apparel industry rise or fall in relation to the speed with which they can ship the latest styles, in relatively small quantities, to retail customers throughout the country. Because of these special conditions and its distance from the larger markets east of the Mississippi, the apparel industry on the West Coast has long been at a competitive disadvantage. Consequently, the West Coast garment manufacturers who distribute their merchandise nationally must be "more modern" than their competitors in the eastern markets. Quite often they are, insofar as their acceptance of modern principles of mechanization is concerned. Apparel



TRUCK is being used by hand in a department to fill an order item. Note boxes on truck; it is also designed to handle hangered garments (see photo at start of article).

manufacturers in the West generally display a greater willingness to innovate than do their counterparts in the older, more traditional garment centers. There are exceptions in both areas, of course.

One outstanding example of an open-minded approach to modernization can be found in the program recently undertaken by the White Stag Manufacturing Co. of Portland, Ore. With some 22,000 stock-keeping units in its varied sportswear line, most of them highly seasonal, White Stag's warehousing and shipping operations had become increasingly vulnerable. Two of its F.O.B. points were on the West Coast. Neither was mechanized, although the two were intended to correlate, stock and ship the major portion of the company's output. These two warehouses were not organized on the basis of the regions served, but by types of items. To further complicate matters, a growing volume was being done in coordinated sportswear outfits, with various parts of the same outfit made by factories in scattered locations.

White Stag's management recognized the runaway potentials inherent in this situation and decided it was necessary to streamline its West Coast warehousing operation and exert tighter control over costs. With the aid of engineering consultants, an exhaustive study was made of the following factors as they existed:

1. Storage and space facilities and how they were utilized;

2. Handling methods and work flow in the warehouse;

3. Inventory planning and control methods;

4. Distribution of stock-keeping units and the relative activity of each;

5. How the workload was distributed, by months and F.O.B. points.

Existing costs of direct labor and overhead were studied, and estimates of required space and stock facilities were made. This analysis of the basic factors led to several deductions:

1. Introduction of new methods and material handling equipment would produce savings in labor costs.

2. Savings in space requirements could be made through new layouts, conversions of existing shelves and bins, a more accurate matching of s.k.u. openings to s.k.u. activity, and the establishment of reserve and forward stock sections. These economies and seemingly minor consolidations of space made the next step possible.

3. Consolidation of the two West Coast F.O.B. points into one, resulting in major savings in overhead and transportation costs.

The F.O.B. point that was closed had been designated to ship around $5 million-worth of garments a year. It had 16,000 square feet and handled 4,500 s.k.u. The remaining F.O.B. point, located adjacent to the firm's Portland plant, had been planned for a $7-million volume, handling 9,000 s.k.u. in 45,000 square feet. At a cost well under $50,000 for new equipment and services, White Stag would have a single warehouse doing the work of two by applying the latest concepts of mechanization and space utilization to its own needs.

MECHANIZED WAREHOUSE

The key concept in White Stag's new F.O.B. point is the way mechanical means are used to take the order through the stock. In most apparel stock rooms, one picker carries one order through to completion, either by bringing the merchandise needed back to one assembly point, or accumulating the items on a truck as he goes through the stock. In the mechanized system at White Stag, however, each order is completed in stages, with a number of pickers contributing to it as it goes through the warehouse. This is accomplished by a Rapistan-Keystone overhead chain conveyor which makes a closed loop

OVERALL VIEW of overhead conveyor system in action. A special truck is moving on conveyor while a second truck at right has been disconnected from system and waiting for order picking. Note hanging stock racks shown in left foreground.

throughout the building's one floor. Work flow into stock, the picking of orders, and transportation back to checking and packing tables all utilize the conveyor. Trucks carrying the orders join or leave the circuit at any point. They can also be set to discharge automatically at any of five major stock areas in the warehouse.. An order progresses in its truck, through each area, in which the items it needs are stocked, bypassing those sections, which have nothing for it. At the end of the circuit, the trucks leave the conveyor and their contents are checked and packed.

Put into cartons, they are carried by roller conveyors across scales, through routing and into holding bins, where they are collated by truck lines. Shipping and receiving are both done through a series of shipping doors at one end of the building.

Most of the changes introduced at White Stag's remaining F.O.B. point illustrate basic principles of space and labor utilization. Here are some details.

SPACE SAVING ACTIONS

To save space, the following changes were made:

Racks for hanging goods replaced "converted bins" to allow a 40% increase in hanging garments per cubic foot.

"Air rights" up to 24 foot high ceilings were used for reserve and inactive stock, both hanger and boxed goods.

Systematic layout and utilization of available space produced 20% more storage capacity.

S.K.U. openings were made smaller for active stock, since these items move into and out of stock so rapidly that they seldom use more than 50% of their allotted cubic space.

At the same time, existing bins were utilized by placing them back-to-back, making the smaller stock openings along their height, and keeping them deep front-to-rear. This served to increase the bin-to-aisle ration.

Labels previously placed on box ends were moved to the sides so that boxes would fit into predetermined bin dimensions more effectively. In some cases, this increased utilization of bin space by as much as 33%.

IMPROVED MATERIALS HANDLING

An order might include hanging garments, boxed items and poly-bagged goods, each with different handling characteristics. To accommodate all variations effectively, a single utility truck was designed. The truck built by Roloway, contains a hinged piece that can be used as a shelf for boxes and small items,

ROLLER CONVEYOR line is shown leading to holding line. Incorporated with the conveyor is a scale.

VIEW of roller conveyor with packaging work places and carton storage racks. System avoids delay in waiting, speeds packing orders.

or can be swung down to form the side-wall of a boxed truck to accommodate garments hanging from the truck's overhead rack. The truck is light, strong and maneuverable. A metal flag at the top can be set to route it to its next distination, where it is discharged from the conveyor automatically. Though this automatic feature, a worker is not tied to his location full time, but is free to roam over his area of the warehouse checking the condition of the stock. Work loads throughout the warehouse are brought into better balance this way.

Sectionalized picking by item sometimes means further collating and checking when the order is finally brought together. This is not the case here, since the order travels the complete circuit as a unit. At the same time, the complete flexibility of a simple truck-picking operation is combined with the advantages of a conveyor with no limitations on travel to and from any location in the warehouse. The overhead chain conveyor does not pre-empt floor space or block travel.

Vertical travel to handle the reserve stock held above the picking areas is facilitated through use of a small, battery-operated fork lift truck. Light enough to maneuver through aisles, the truck is operated by one man standing on the lift platform. He moves stock onto and off the platform, and moves the lift up or down.

Filled orders are discharged for checking and packing at any available packing workplace. When packers finish one order, they move to the next available station containing a checked order, avoiding the delay of one worker waiting for the other.

Cartons of various sizes are stored above the packing stations to save steps for packers. Packed cartons are pushed on dollies to adjacent roller conveyor for delivery to strapping, weighing and routing stations, which are built into the conveyor to avoid extra handling.

Stops at each station hold the cartons prior to processing. An automatic pressure control releases the pressure driving the cartons along the conveyor when one is stopped for processing.

OTHER AIDS

A simple perpetual inventory using the exception principle was installed at the order dispatch center. This predetermines exactly which items are in stock and available for any given order, and which items are unavailable. "Dry runs" to pick up items that may be out of stock are generally prevented.

A "Dial-A-Phone" system connects the dispatch center with the five different stock areas. This and an electric golf cart for the use of the supervisory personnel strengthen communications and cut distances enormously in the long, narrow warehouse.

SUMMARY

By analyzing existing conditions and applying solid principles of space utilization and mechanization, sizable savings have been realized by White Stag. In addition to the overhead—rent, heat, light and supervision for one F. O. B. point—the company has reduced its cost per dollar shipped from the remaining F. O. B. point by 42% in the first four months of operation, compared with a similar period a year before.

The author of this article, K. Dean Vought, is a member of Kurt Salmon Associates, a consulting management engineering firm that has served the textile and apparel industries since 1935. The firm's headquarters are at 3000 Albemarles St., N.W., Washington, D. C.

PUNCHING RESET BUTTON of rack-installed automated anodizing controller is Bernard Van Emden, chief research engineer, Automation Development Corp. Tape controller will completely automate anodizing run. Unit will cause immediate reduction in voltage if a burn is indicated.

ANODIZING PROCESS is tape controlled

Benefits have been more rapid processing, higher quality and more uniform coatings. Here is how this profit saving operation is accomplished.

A NEW TAPE programmed anodizing controller recently placed in operation at Farrington Sanford Co., subsidiary, Farrington Mfg. Co., Inc., is allowing the anodizing process to be performed more rapidly and is producing higher quality and more uniform coatings than possible by manual operation.

Designed and produced by Automation Development Corp., Culver City, Calif., the fully automatic control system for anodizing or coating of aluminum consists of a Model 416A anodizing controller and operates in conjunction with a Model 417A anodizing tape programmer.

Once an operator places material to be coated in the anodizing tank and pushes the start button, operation is fully automatic. The controller maintains proper voltage across the tank to an accuracy greater than 2%.

Special circuits are provided to reduce immediately voltage across the tank if a "burn" indication is detected by the equipment. The tape programmer feeds process information to the controller, i.e., causes the voltage across the tank to be programmed with time to produce optimum coating for the particular part or alloy.

When compared with current manually operated anodizing systems, significant savings can be achieved, according to Walter E. Peterson, Automation Development Corp.

First, a single operator can now handle about four times as many tanks simultaneously. The process can be achieved about 30% more rapidly because it is always performed at the optimum and can be repeated accurately by tape programming as often as desired without variables through human error.

The equipment produces higher quality and more uniform coatings with less waste or rejects. Initial cost and maintenance of the relatively simple unit is much less than the cost required to train personnel to manually control the many variations in processing voltages. Also it enables a licensor to code his particular coating process on punched tape which can then be dispatched to his licensees.

A licensee can place the tape in a controller program equipment to accurately reproduce the process without the licensor having to divulge details of the process or bearing the high cost of training licensee personnel to perform the specific process.

The controller weighs about 25 lbs., is 19-in. wide, 7-in. high, and 10-in. deep. It can be installed in a rack or console. The programmer weighs about 30 pounds, also can be rack or console installed, is 19-in. wide, 8¾-in. high and 12½-in. deep. Both units operate from 110 volts, single phase, DC current.

The units are described as having sufficient flexibility for adaptation to many variations in processing new being employed by the coating industry.

REPRESENTING Wales-Strippit in their booth are: left to right, Homer Gray, Mel Steck, Rex Hunter and Charles Merryman. Firm makes punching and notching equipment.

WESCON SHOW is huge success

Growing in size and prestige every year, this regional trade show is achieving national recognition. The 1961 Show at the San Francisco Cow Palace had 1170 booths and over 800 exhibitors.

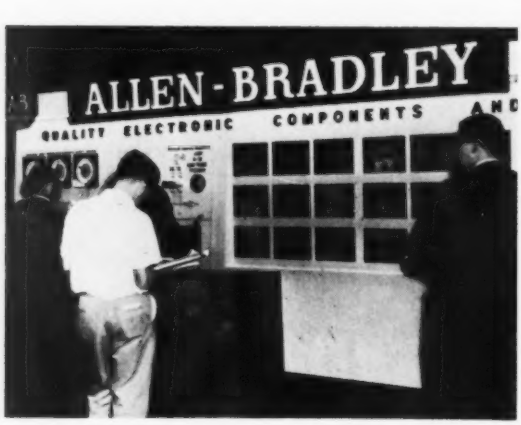
THE 1961 WESCON Show opened its doors on Tuesday, August 21 and ran through Friday, August 25. Crowds of more than 35,000 attended the huge show and visited the over 800 exhibitors, who occupied 1170 booths at the San Francisco Cow Palace. The auditorium was stretched to capacity with exhibits occupying the main arena, both annexes and all adjacent buildings.

This show, the largest of any of the Western trade shows is growing and achieving more prestige each year. This year's event gained recognition as an important national as well as regional event. An exhibitor at the Show, International Resistance Company, sponsored daily telecasts direct from the scene at WESCON. The telecasts were seen not only in San Francisco but in Los Angeles, Philadelphia and New York City.

The growing national interest in WESCON is because so many top electronic firms are located in the West and usually select this event to unveil their newest developments. According to a recent survey one-fourth of total sales and employment in the electronics industry is from the 11 Western states.

Many of the exhibitors had new equipment shown

SECTION of Honeywell's display at the Show. Walter Burton, Manager of Services, Merchandising Division, at right, inspects panel showing firm's new door interlocks.



ALLEN-BRADLEY booth featured both electronic components and motor controls, the latter for the first time at a WESCON Show.

PACIFIC SCIENTIFIC'S W. L. Hawks, left, and Robt. Morton demonstrate products from Columbia Research Laboratories and Lockheed Electronics Co.

for the first time. Sylvania displayed the world's largest crossed grid electroluminescent panel. On this 16x16 in. panel light is created through the excitation of phosphors placed in an electrical field. SPS showed, in one of their two booths, new ready-to-weld copper semiconductor bases in full hard condition and made of a special alloy. Ampex introduced a new transistorized, modular tape unit. Transdata unveiled their high speed character generator, which is able to display up to 100,000 characters per second. Allan Bradley showed both their electronic components and motor controls, the latter for the first time at a WESCON Show.

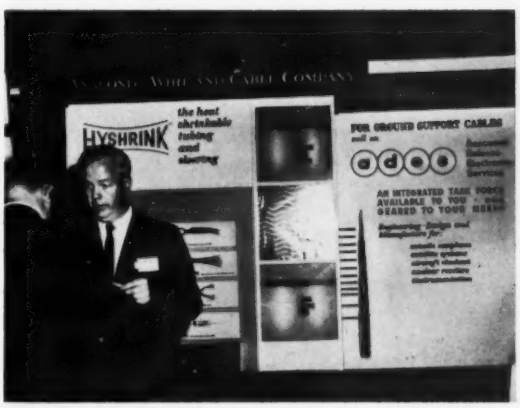
Among other equipment exhibited were new Honeywell oscillographs with a galvanometer protector, which prevents these instruments from overload damage, and a number of new switches. Hewlett-Packard brought out 22 instruments in new modular enclosures. Varian highlighted a number of items, all new, including microwave tubes, high vacuum systems and new microwave devices. Also of interest was a new cableless underwater communication system that combined telemetering with sonar. It was introduced by Bendix-Pacific and believed to be the first of its kind.

While the Western Electronic Show was being held, the technical convention also was taking place. One hundred and twenty papers were presented during 42 different technical sessions. This year there was an emphasis on the field of radio and radar astronomy. Coupled with the technical sessions were field trips, during which eight Bay Area installations were visited.

Other events of the week included the third annual Wescon Industrial Design Awards, and a Future Engineers Show, both held in the Cow Palace in connection with the main show. On Monday, August 21, the day before WESCON opened, electronic distributors, representatives and manufacturers met in an all-day meeting at the Jack Tar Hotel.

SPS BOOTH was manned by: left to right, Hank Schaffner, San Francisco office; Charles Betz, manager, outside sales; and Walter Kobe of Aircraft Missile Div.

AT LUXO LAMP booth, Robert Rubin, Manager Western Division, left, and James Barnett, show the firm's latest models used for intricate assembly work.



ROBT. WISNOM, Electronic Wire & Cable Product Manager, Anaconda Wire and Cable Company explains the firm's new shrinkable tubing to an interested visitor.

TRI-STATE showed products from Formica, Anaconda Wire, Cable & Coil Winding Equip. Mrs. George of latter firm talks to visitor; Geo. Eickmeyer, Tri-State is at left.

FLASH WELDING
of aluminum and magnesium

A new technique places flash welding of these metals on a production line basis for the first time. Here is how it is done.

A MANUFACTURING TECHNIQUE, that for the first time makes flash welding of aluminum, magnesium and magnesium-thorium alloys a production-run operation, has been developed by Lockheed's Burbank, Calif. plant and reportedly makes weldments 4 times stronger at about one-fourth the cost in some cases.

According to M. L. Ochieano, of the firm's value engineering dept., the operation uses resistance welding technique on a modified 400 KVA flashwelder. Modifications to the unit, made by Taylor Winfield Corp., are on the jaws that serve as both clamps and conductors. Copper jaws on the production model were replaced with those made from heat treated tool steel.

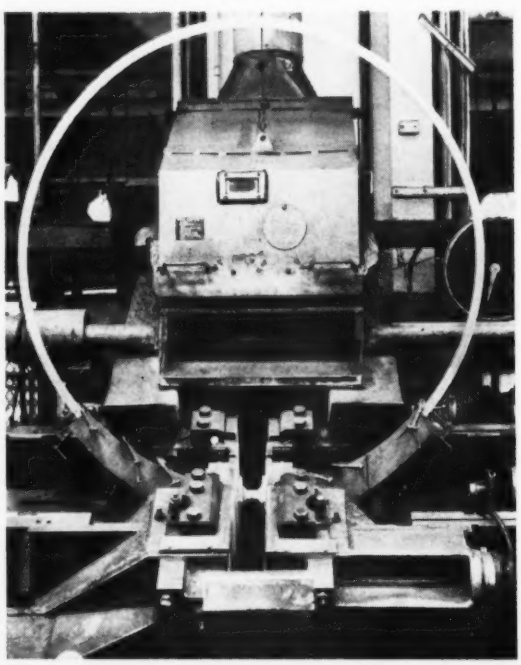
When used in the manufacture of aluminum alloy structural rings for missiles, the ring itself is fixtured in dies and shoes on each side of the joint and is clamped to overcome forces during the upsetting operation that brings the ends of the ring forcibly together to form a weldment.

Flashing time is pre-set by the operator. In the flashing process, metal is actually burned off on both ends of the aluminum ring and heat is conducted back on both sides of the potential joint to bring the areas up to forging temperature.

At the optimum moment, a pressure reservoir is activated and the heated edges are mechanically slammed together. This action extrudes excess liquidus metal through small orifices in the dies holding the edges of the part. Formed is a joint that is comparable in strength to the parent metal.

Flashing time and temperature requirements of course vary on the type of metal, its thickness and the geometry involved.

OPERATOR APPLIES series of C-clamps to secure aluminum alloy ring in welding machine so that it will not be jarred out of position during upsetting when edges of ring are forced together to form weldment.



WITH CLAMPS in position on both sides, ring is ready for welding operation on this 400 KVA unit. Hood, upper center, is pulled down over work area during operation for operator's protection. Work can be viewed through peephole in hood.

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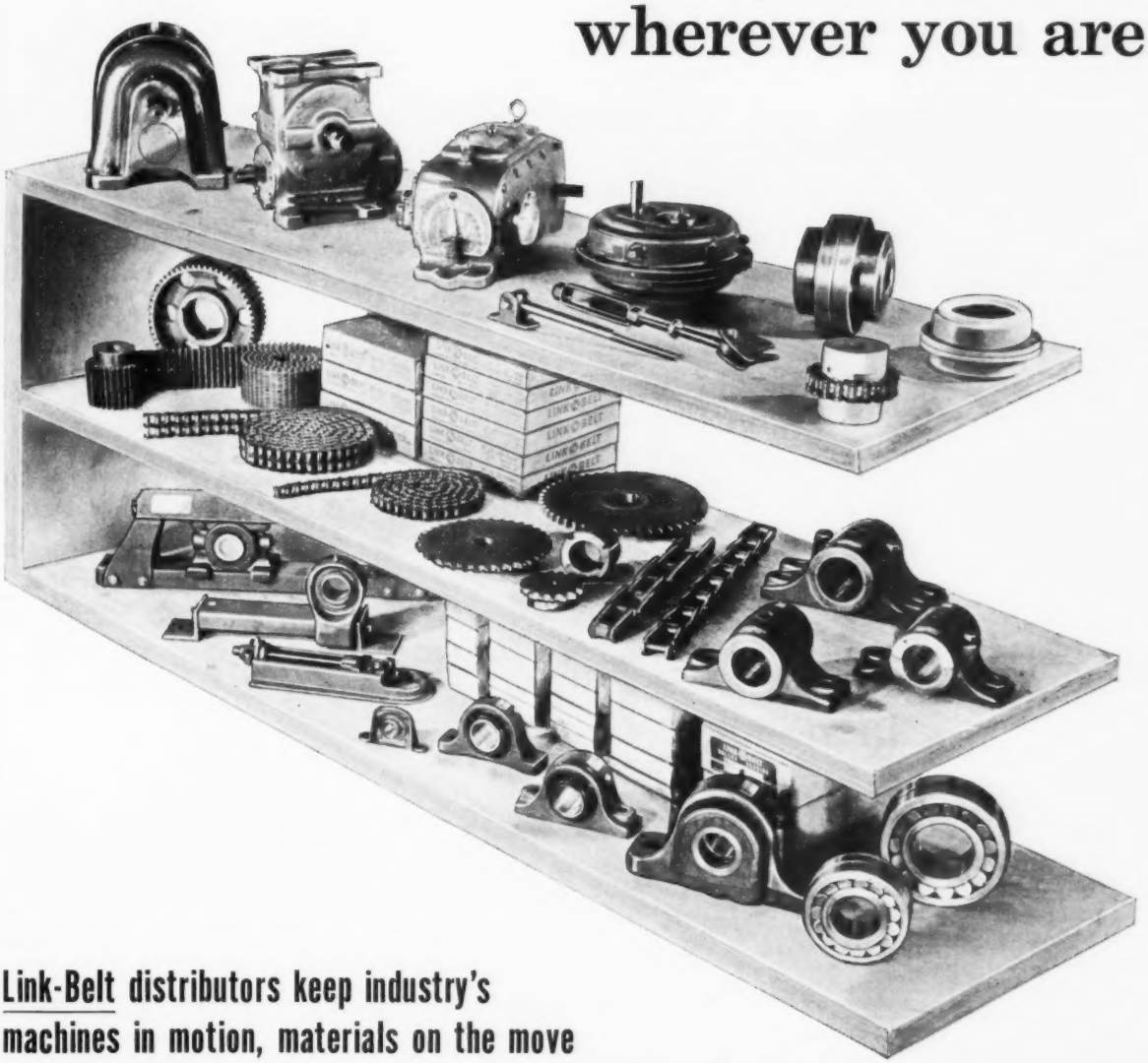

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The shelves of Link-Belt authorized stock-carrying distributors stretch from coast to coast. These shelves, backed by Link-Belt's strategically located warehouses, assure ready availability of the world's broadest selection of related mechanical power transmission products. Add to this a complete line of conveying and elevating components and you have the reasons why Link-Belt distributors successfully serve and satisfy customers. See the classified yellow pages of your telephone directory for the nearest Link-Belt district office or distributor. Or write: Link-Belt Company, Dept. 961-WM, 400 Paul Ave., San Francisco 19. 15,558-P

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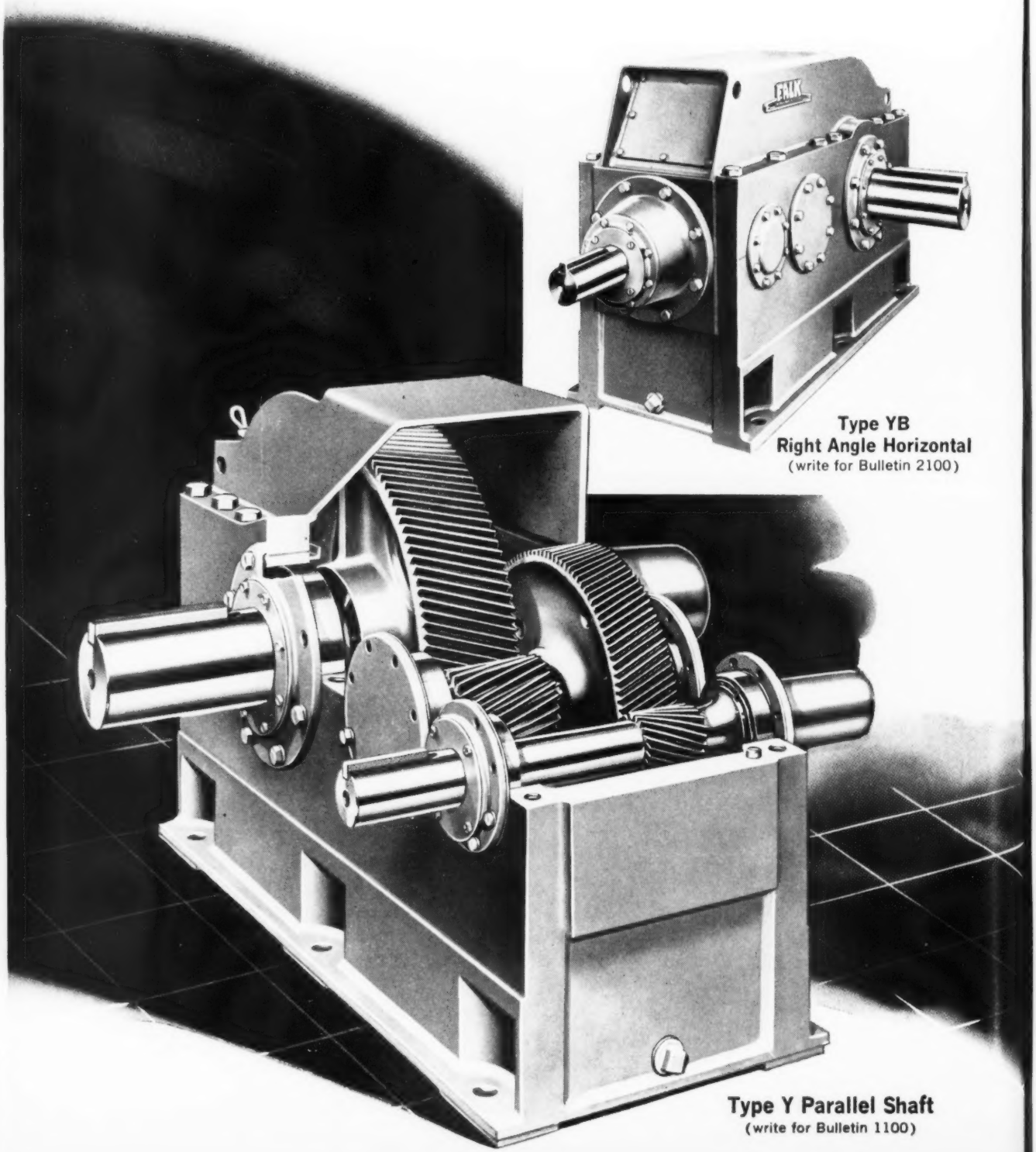
For more details adv. pgs. 52 & 53, circle No. 35 on Reader Service Postcard

NEW



Type YB
Right Angle Horizontal
(write for Bulletin 2100)

Type Y Parallel Shaft
(write for Bulletin 1100)

Parallel Shaft and Right Angle Horizontal Reducers cataloged thru 1,570,000 lb-in. torque at low speed shaft . . .larger units upon request. Ratios 1.84 thru 292 to 1 for parallel shaft; 5.06 thru 1207 to 1 for right angle horizontal

These new units are probably the most thoroughly engineered speed reducers on the market today. Final designs based upon years of development study and a background of 50 years experience make these units as dependable as the name "FALK". A few of their many features are...

PINPOINT APPLICATION COVERAGE Wide choice of sizes and ratios permits the most economical selection of a correctly rated unit for each application. In each series of parallel shaft and right angle reducers, cataloged sizes range up to 1,570,000 lb-in. torque at the (11 inch dia.) low speed shaft. (Other standard designs to 25,000,000 lb-in. torque; custom designs for higher capacities.)

UNMATCHED VERSATILITY The "Basic Y" speed reducer design permits economical modification to meet a multitude of specific requirements. Smooth, flat surfaces simplify mounting of motor brackets, backstops, brakes, and any number of other accessories.

RUGGED HOUSINGS Sturdy housings not only provide maximum rigidity to maintain proper alignment of gearing, but also have the strength to support heavy overhung loads and withstand accidental blows.

DEPENDABLE FALK GEARING Gears are selected with the proper proportions and hardness to provide the optimum combination of maximum durability and strength for high shock as well as uniform loads.

BEARINGS TO SUIT THE OVERHUNG LOAD Standard reducers can meet custom-built requirements with optional stock bearings and shafts (at only a nominal extra charge.) Maximum overhung load capacities are so great that for some conditions, still within the capacity of the reducer, extra strong supporting foundations and bolts must be provided.

DOUBLE GEAR LIFE Standard double ended shafts can be reversed end for end to bring into contact the unused surfaces of the gear teeth for twice the normal gear life.

SEALS FOR ALL CONDITIONS Standard equipment oil seals assure oil-tight and dirt-free gear units for normal applications. Standard abrasive and moisture-resistant seals available upon order.

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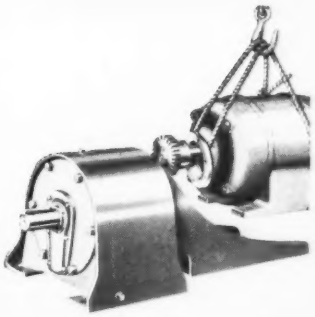
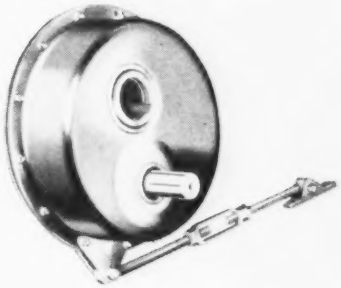
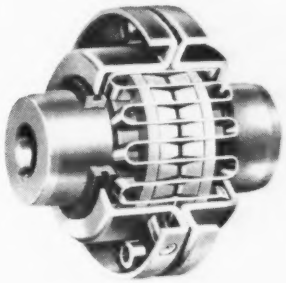


ALL-MOTOR MOTOREDUCERS



SHAFT MOUNTED DRIVES



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HELPFUL LITERATURE

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DUCTILE VALVES 136

Catalog by Stockham Valves and Fittings contains general data, pressure rating, design, trim materials and engineering specs on ductile iron valves and fittings. A table shows comparison of physical and chemical properties of ductile with grey and malleable irons and WCB steel. Describes types available in ductile. *Allied Supply Co.*

MAGNETIC SEPARATORS 137

Illustrated bulletin describes a new wet drum magnetic separator with ceramic permanent magnets. Covers advantages, applications, general construction, drives, box construction and design, capacities, magnet design and standard sizes available. *Jeffrey Mfg. Co.*

PORTABLE ELEVATORS 138

This booklet is a guide to portable elevators, showing examples of the basic types and features of each model. A check list of information required for selection of the proper type of portable elevator is included. *Revolvator Co.*

SLIP PROOF FABRIC 139

Brochure describes a new slip proof fabric for platforms, docks, ramps, factory floors, walkways, wash rooms, aisles, corridors and production lines. Gives data on two types of the surfacing materials, advantages of its use and sizes, colors and shapes. *Carborundum Co.*

FASTENER 141

A clip-on fastener designed to speed assembly is the subject of this bulletin. Describes advantages of the design and illustrates simple installation and removal procedure. Covers features. *Elastic Stop Nut Corp. of America.*

WIRING CONDUIT 142

A flexible, liquid-tight electrical wiring conduit is the subject of this bulletin. Describes types available, construction features, applications, advantages, and specifications. Also includes data about an extra flexible conduit. *Anaconda Metal Hose Div., Anaconda American Brass Co.*

DELRIN ACETAL PLASTIC 143

Properties and applications of Delrin acetal plastic are presented in this 24-page booklet. Covers design factors, dimensional stability and resistance to solvents, fabricating and finishing of both molded machined parts. *Cadillac Plastic & Chemical Co.*

LIQUID CYLINDER 144

Brochure features the storage and supply advantages of a new liquid cylinder for industrial gases. Includes illustrations and a detailed specification table presents all the pertinent data on the cylinder. *Air Reduction Pacific Co., Div. Air Reduction Co., Inc.*

COMPRESSED AIR 145

Comprehensive 36-page engineering manual contains technical information about compressed air. Diagrams a correct air system installation; discusses atmospheric air, pressure losses in air line systems and moisture in air. Explains three steps in selecting a compressor and covers design of pneumatic-hydraulic systems. *Wilkerson Corp.*

PHENOLICS 146

Illustrated brochure gives guidelines for designing with phenolic molding compounds. Lists typical applications and design properties of these materials and compares their costs with those of metals. *General Electric Co. Chemical Materials Dept.*

DIAMOND WHEELS 147

New catalog of diamond wheels and diamond hones contains general information on diamond wheels, recommended starting specifications for a wide variety of work and a section of wheels for silicon and germanium cutting. *Norton Co.*

EPOXY RESIN BOND 148

Informative illustrated brochure about epoxy resin bond for maintenance purposes wherever there is a need for renewing old concrete surfaces, for patching or spalling. Describes 14 different epoxy resin formulations developed for specific jobs including wood, metal and other materials. Includes data on chemical resistance tests. *Sta-Crete, Inc.*

BALL VALVES 149

Socket welding end ball valves and ball valves for seal welding applications are covered in this new bulletin. Describes available sizes, materials, pressure-temperature ratings and illustrated step by step description of proper welding procedure. *Pacific Valves, Inc.*

REPAIR CLAMP 151

Information about an all-around repair clamp is detailed in this bulletin. Suggests and illustrates applications of the clamp. Includes installation instructions, sizes and specifications. *Dresser Industries, Inc., Manufacturing Div.*

FLOOR MAT 152

A flexible floor mat that is easy to clean and maintain and that helps prevent worker fatigue is described in this literature. Covers construction materials, sizes available, advantages and illustrations of the "springboard mat". *Southern Mfg. Co.*

For more details adv. opp. pg., circle No. 36 on Reader Service Postcard ⟶

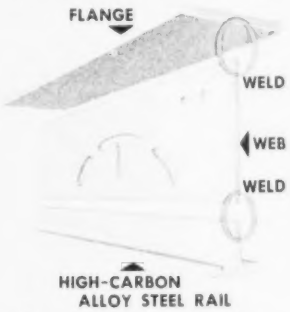
CLEVELAND TRAMRAIL
ANNOUNCES

TARCA TRACK

FOR OVERHEAD MATERIALS HANDLING

Continuous automatically-controlled welds

Flange, web and rail joined by continuous automatic welds assure reliability.



Hard, raised, long-life treads

Rail especially rolled of high-carbon alloy steel for maximum durability. Treads are extra hard, raised, flat and smooth—for easy load movement—prevent peening—longer wear.

An outstanding advancement in a long series pioneered by Cleveland Tramrail to make it the leader in the overhead materials handling equipment industry. An entirely new track that had to be great to be better—result of years of research.

Balanced design with parts proportioned exactly to provide maximum strength with minimum weight. Greater rigidity to withstand severe working conditions.

Straight, true, smooth. All dimensions held to greater accuracy. Tarca Track matches with existing Cleveland Tramrail installations.

10 standard sizes from 8″ to 20″ deep. Special sizes can be fabricated for unusual applications.

Ask for this helpful booklet—No. 7023

Covers all major features the buyer should know about overhead materials handling equipment. Has complete story on Tarca Track. Contains detailed equipment specifications and handy proposal evaluation form.

Materials Handling

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
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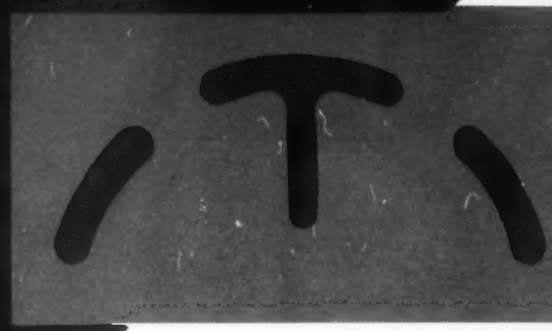


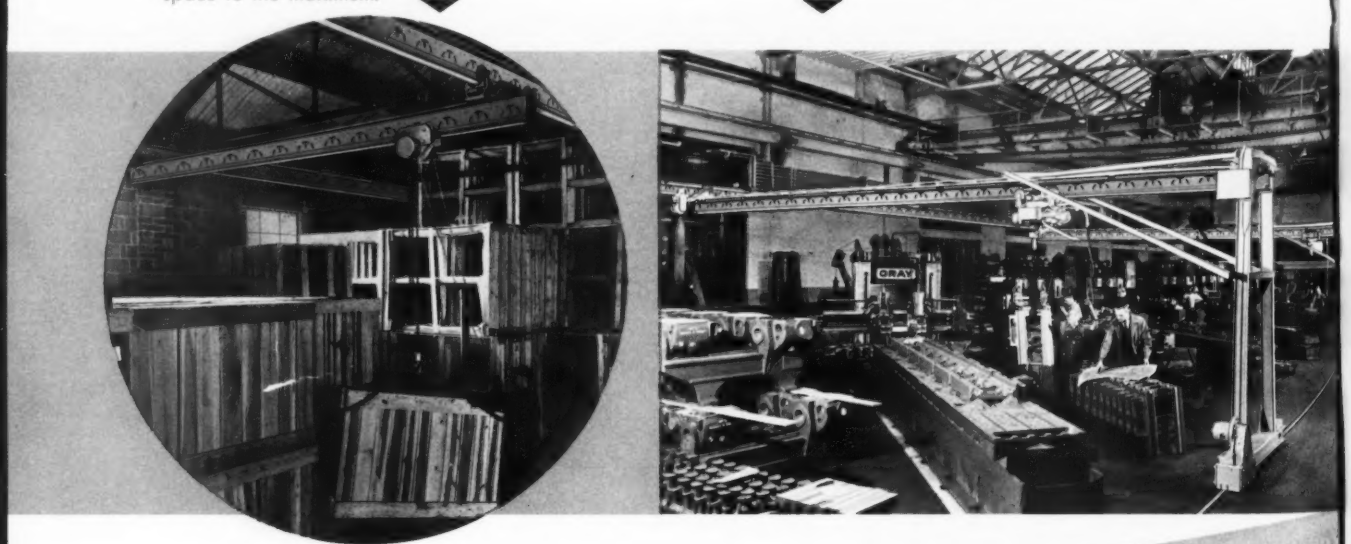
Most Installations of Cleveland Tramrail Equipment pay for themselves within one or two years.

Trade–mark of durability and strength —punched into all Tarca Tracks.

One of the more recent important materials handling developments initiated and engineered by Cleveland Tramrail for the Wire and Rod Industry is the hydraulically-operated grab for storing coils in vertical piles. This device picks up several coils at a time and works in either vertical or horizontal positions.

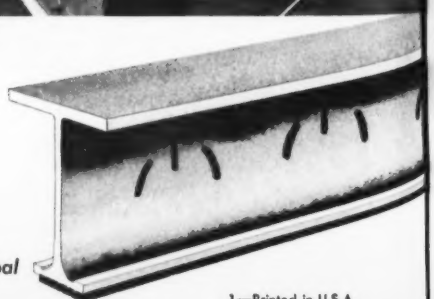
Simple inexpensive hand-propelled Cleveland Tramrail cranes are filling a mighty important need in a vast number of places. For instance, in this warehouse of a glass distributor, heavy awkward cases are handled by one man and piled high, thereby utilizing the storage space to the maximum.

Cleveland Tramrail gantry cranes have long been popular because they increase efficiency of many local handling situations. They will operate under overhead cranes without interference. Tramrail gantries are built in many types and sizes, with manual or electric drives.



Your Cleveland Tramrail Sales Engineer is Qualified to give you the Complete Design and Application Story on This Revolutionary

NEW TARCA TRACK



Cleveland Tramrail is represented by competent, experienced engineers in all principal cities of the United States and Canada. Contact address on other side.

1—Printed in U.S.A.

Literature Advertised In This Issue

Overhead Track **36**
Booklet gives details on newly developed track for overhead materials handling. Page 55, *Cleveland Tramrail Div., Cleveland Crane & Engineering Co.*

Trucking Route Map **69**
Route map and point list for nationwide thru-trailer service. Page 88. *Pacific Intermountain Express.*

Trucks for Food Industry **85**
Bulletin about special electric trucks for food industry. Application story. Page 3, *Baker Industrial Trucks, Div. Otis Elevator Co.*

Adjustable Speed Drives **21**
Booklet gives complete data on adjustable speed drives from ½ to 2500 hp. Page 12, *Louis Allis Co.*

Helical Gear Pumps **47**
Brochure covers helical gear pumps designed to handle anything that flows. Page 69, *Fernholtz Mfg. Co.*

Metal Stock Products **26**
Stock list of metal sheet and plate, extruded rods, centrifugally cast semi-finished bars; and resistance welding products. Page 19, *Ampco Metal, Inc., West Coast Div.*

Hoists **65**
Catalog covers electric chain hoists in a range of capacities and speeds from ⅛ to 2 tons and 8 to 60 fpm. Page 86, *Chisholm-Moore Hoist Div., Columbus McKinnon Corp.*

Steel Buildings **32**
Facts about new building sizes, designs, and special features. Page 39, *Armco Drainage & Metal Products.*

New Electrode **29**
Engineering data and samples of new iron powder, low hydrogen electrode for mild steel. Page 37, *Air Reduction Pacific Co., Div. Air Reduction Co., Inc.*

Taper-Lock Mountings **16**
Bulletin gives cost-saving data on taper-lock method of mounting wheels on shafts. Page 6, *Dodge Manufacturing Corp.*

Variable Speed Drives **51**
Catalog gives complete data on variable speed drives from fractional through 25 hp. Page 72, *Gerbing Manufacturing Corp.*

Roofing **43**
Bulletin describes the Monoform System for roof maintenance or new roofing. Page 63, *Flintkote Co.*

Stainless Steel Tubing **59**
Brochure covers sizes and alloys of centrifugally cast stainless steel tubing. Page 81, *Centrifugal Casting Co.*

Fork Truck Safety **14**
Illustrated manual on fork truck safety-operating hints. Page 3, *Baker Industrial Trucks, Div. Otis Elevator.*

Field Warehousing **58**
Sixteen-page book, "more working capital through field warehousing." Page 80, *Haslett Field Warehousing.*

Airtube Carriers **63**
Catalog gives data on Airtubes for speeding in-plant transit of many smaller items. Page 84, *Lamson Corp.*

Color Horizons Systems **27**
Full-color catalog on New Color Horizons System and specialized coatings that stop rust. Page 21, *Rust-Oleum Corp.*

Oil Resistant Belting **81**
20-page catalog describes conveyor belts that resist oil and grease. Page 103, *Ton-Tex Corp.*

Drives from Stock **42**
Catalog on Reductors and Ratiomotors for designing drives from stock. Page 62. *Boston Gear Works.*

GAS REGULATORS **153**
New 40-page booklet on regulators for the accurate control of industrial gases in all applications also gives information on accessory equipment for the various regulators. A cross-referenced, illustrated layout, in which all regulators are classified according to use, provides a convenient way of finding information. *Air Reduction Pacific Co., Div. Air Reduction Co., Inc.*

METAL HOSE **154**
Bulletin about a wide selection of flexible metal hose specially designed for gravity or pneumatic transfer of grains and bulk materials where resistance to severe abrasion and corrosion are required. Also covers couplers for mechanical clamp grip and couplers for speedy action automatic lug grip for use on pneumatic transfer systems. *Universal Metal Hose Co.*

HIGH TEMPERATURE ALLOYS **155**
New booklet on high temperature, high strength alloys which are used in the aircraft, aircraft engine, gas turbine, missile and any other applications where corrosion resistance, and high strength at elevated temperatures are needed. Includes high temperature alloy graphical charts, test data, machining data, and test procedures. *Allegheny Ludlum Steel Corp.*

BALL VALVES **156**
High pressure ball valves are discussed in this brochure. Describes available sizes, materials, pressure-temperature ratings and various applications. Also included are high pressure "fire-safe" ball valves, high pressure steel lock ball seals, fire safe stem packing and body gaskets, and a resume of the physical properties of nylon and Delrin. *Pacific Valves, Inc.*

AIR-POWERED EQUIPMENT **157**
New 32-page catalog on air-powered equipment for materials dispensing applications. Includes pumping systems to dispense paint, cold roofing materials, food materials, caulking compounds and sealers, mastic adhesives and glues, vinyl materials for plastic molding, inks, underbody coatings, sound deadeners and similar fluid or semifluid materials. *Lincoln Engineering Co.*

STEEL SHELVING **158**
The assembly features, component parts and practical advantages of three basic types of steel shelving are described in this 36-pager. Discusses and pictures two types of adjustable shelving and a fixed type, complete with how-to-plan information. Installation photos show the many uses and space-saving advantages of each type. *Columbia-Hallowell Div., Standard Pressed Steel Co.*

TRAPPING AND CONTROL 161

Problems and solutions in steam trapping and temperature control are featured in issue of quarterly magazine devoted to heat conservation and control. Illustrated with drawings, charts and graphs. *Sarco Co., Inc.*

URETHANE FOAM 162

The packaging properties of urethane foam are examined in this 20-page illustrated booklet. In addition to molding in place and contouring advantages, such characteristics as good vibration damping, lightness, as well as resistance to chemicals, dampness and wide temperature fluctuations are discussed. *Mobay Chemical Company.*

CLIP SHELVING 163

Well-illustrated 28-page catalog of descriptive and technical data on clip shelving for specific storage requirements. Describes the clip, easy erection of units and features of construction. Includes illustrations of open units, closed units, bin units, tool room and ledge units. *Worley & Co., Ekco Products Co.*

DIE-BLOCKS 164

Bulletin describes different types of die-blocks and hot work steels for all types of forging operations. Recommended uses and tempers of the various types of die-blocks are presented. Helpful information about selecting the right die-block, sinking the impression, setting up the die in the hammer and re-sinking are also covered. *A. Finkl & Sons Co.*

POLYETHYLENE TAPE 165

Data about a new waterproof polyethylene tape is presented in this bulletin. Describes three advances in the all-purpose pressure-sensitive tape and suggests numerous applications in sealing, patching, joining and fastening plastic sheeting. *Gering Plastics, Div. Studebaker-Packard Corp.*

TRANSMISSION SERVICING 166

New 68-page manual is devoted to servicing the power-shifted Hydratork transmission used on gasoline powered Clark-lift fork trucks. Includes 196 photos and cutaway drawings which provide a step-by-step approach for trouble shooting, tear down, overhaul and assembly of the torque converter and transmission. *Industrial Truck Div., Clark Equipment Co.*

ELECTRONIC DIE CUTTING 167

The benefits of electronic cutting in such areas as rubber, plastic, leather, and textile materials are presented in folder and fact sheets. Describes the advantages of electronically controlled cutting machine and how the cutting operation in many industries is an improvement over cutting with conventional clickers. *United Shoe Machinery Corp.*

LAB JACK 168

Complete information and details on a laboratory jack are contained in this illustrated brochure. Includes specifications and describes accessories. *Central Scientific Co., Div. Cenco Instruments Corp.*

EPOXIES 169

Publication contains 48 pages of technical data on bonding agents, potting compounds, sealants, coatings and accessories. The catalog also includes a number of new epoxy products representing break-throughs in the field of high temperature, thermal-conductivity, light-weight and one-component epoxy formulations. *Carl H. Biggs Co.*

MICRO-DEBURRING 171

Data sheet about newly developed micro-deburring equipment describes new system that provides power in excess of 200 watts per gallon capable of removing minute metal micro-burrs from machined surfaces without damaging delicate parts. Covers applications, system features and specifications. *Ultrasonic Systems, Inc.*

DUST CONTROL 172

Prefaced with a non-technical explanation of the advantages of proper dust control, this 20-pager lists the basic essentials of a typical dust control system. Describes and illustrates each dust collector with photos and line drawings. Includes new electric furnace exhaust hood and cloth tube collector for high-temperature, corrosive-gas applications. *Pangborn Corp.*

COMPONENT RAILS 173

Literature explains how to make your own gravity wheel conveyor of component pieces. Gives data on available sizes of the steel track channels and a load chart. *North American Equipment Corp.*

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WESTINGHOUSE improves new transformers 5 ways with aid of REVERE ROLLED COPPER in coil winding

New design extends range of lightweight pole-type transformers to 500 Kva

In seeking to solve the problem of cross-sectional requirements in the winding of conductors in low-voltage coils of large Distribution Transformers, Westinghouse design engineers noted that their primary concern was: How to reduce the number of individual conductors in the low-voltage windings.

The final design is one which uses a sheet of copper across the width of the low-voltage coil so that one turn becomes one layer. The thickness of the sheet is varied to give the required sectional areas (see photo lower left).

Westinghouse engineers, in collaboration with Revere and other suppliers, wrestled with the problem of securing a satisfactory sheet material for this purpose for over a year. The layer insulation was designed to be sufficient for turn-to-turn insulation; this eliminated, from an electrical standpoint, the need for insulated sheet copper. However, this method presented still another problem. For, to accomplish this, the copper sheet had to be sufficiently burr free to permit the use of a single sheet of thin layer insulation. The answer to this problem was the development of a smooth Revere Rolled Copper sheet, which contributed to giving the new Westinghouse sheet-wound copper design transformer the following outstanding advantages:

1. A compact coil of great inherent mechanical strength against short circuit forces.

2. Reduction in losses and impedance by reducing the high-low space to a minimum.

3. Weight reduction directly through reduced mean turn and indirectly by eliminating coil bracing.

4. More effective cooling obtained by removing coil blocks and braces.

5. Total lower weight of unit which permitted extension of pole mountings to ratings which were previously available only in the substation type.

Find out today how Revere Rolled Copper can be used to advantage in your coil winding application.

REVERE

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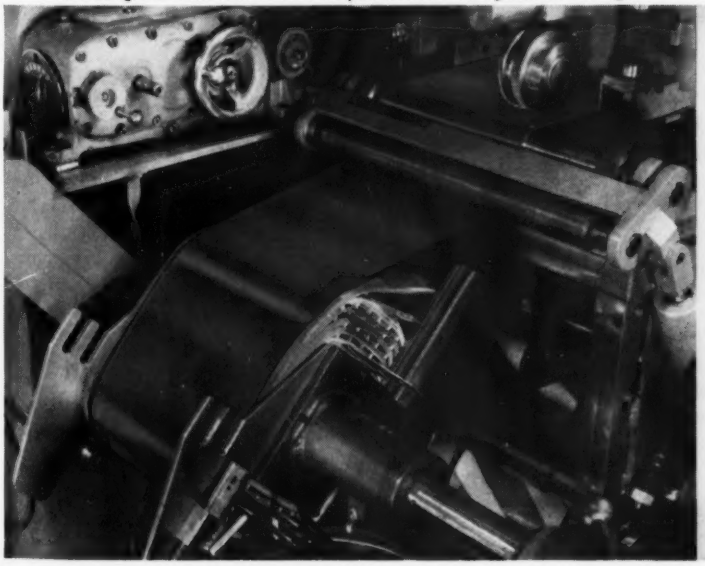
PACE-SETTING sheet-wound coil design uses a sheet of copper across the width of the coil so that one turn is one layer of the Low-voltage coil. The new design has enhanced transformer performance and lightened the weight.



ONE OF THE WESTINGHOUSE transformers—a 500 Kva, 7200 Volt rating—incorporating the new design. Previously available only in the substation type.

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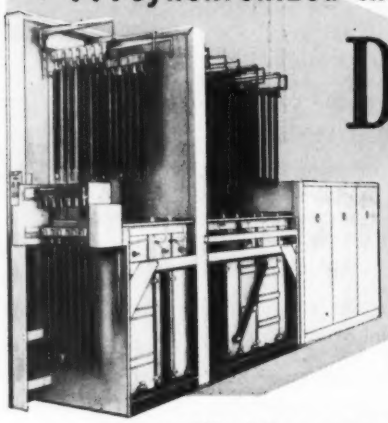

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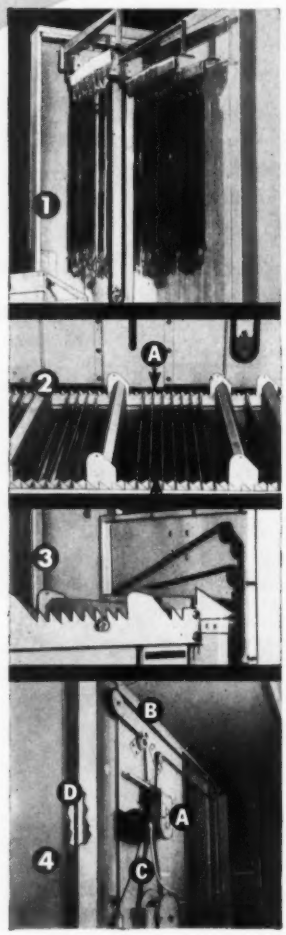

❶ On exact, predetermined time schedule, DIAMOND Chain powered transfer arms on elevator bar shift film hangers to next processing tank.

❷ DIAMOND Chain powered "saw-tooth" tracks (A) move hangers at precisely one tooth per minute.

❸ DIAMOND Chain synchronizes film dryer with processor; delivers a hanger of dry film each minute.

❹ Rear of PAKO Automatic Filmachine shows speed reducer (A), DIAMOND Chain transfer arm drive (B) and "saw-tooth" drive (C). Counterweights slung from DIAMOND Roller Chain (D) help insure smooth elevator bar operation.

PAKO Automatic Filmachines, manufactured by the PAKO Corporation of Minneapolis, Minnesota, process and dry up to 420 rolls of black and white film per hour. Color machines handle up to 300 rolls per hour. All units are equipped with DIAMOND Roller Chain.

DIAMOND Chain offers many opportunities to solve timing, conveying, and power transmission problems. Call your DIAMOND Distributor or write direct to DIAMOND CHAIN COMPANY, INC., *A Subsidiary of American Steel Foundries*, 402 Kentucky Avenue, Indianapolis 7, Indiana. Dept. No. 606

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BERYLLIUM BOLTS 17

Interesting 16-page booklet on first beryllium bolts scans the development of the metal starting with the year 50 A. D., and reviews the history of beryllium to date as a lightweight, structural material. A technical section covers the outstanding physical characteristics of beryllium. *Standard Pressed Steel Co.*

GEARED RIVETER 175

A new hand-size all purpose geared riveter with 1½-ton gripping power for making permanent steel, aluminum, plastic-to-metal and metal-to-wood fastenings is described in this bulletin. Covers advantages, operation and applications. *Mid-American Mfg. Co.*

MATERIALS HANDLING 176

New 20-page brochure covers fork trucks, powered hand trucks, straddle carriers, towing tractors, attachments and container handling equipment. Includes action photo of each piece of equipment and data on capacity, turning radius, overall length and width, standard fork length and height and service weight. *Clark Equipment Co., Industrial Truck Div.*

STEAM CLEANING 177

A concise compilation of the most modern methods and materials currently used in steam-detergent cleaning is presented in this booklet. Offers valuable tips on steam cleaning in general and lists six essential properties for effective detergent-steam cleaning. *Oakite Products, Inc.*

WORK CLOTHES SYSTEM 178

Descriptive literature about equipment for handling work clothes that results in centralized dispensing of clean work clothes and centralized collection of soiled clothing. Outlines numerous advantages of the new locker system and illustrates the operation. *Change-O-Matic Corp.*

ELECTROPLATING ANODES 179

Bulletin illustrates and describes anodes, anode accessories and chemicals for electroplating and metal-finishing. Nickel, cadmium, brass and bronze, copper, lead and zinc anodes are covered. Includes data on new titanium anode baskets. *Hanson-Van Winkle-Munning Co.*

TRUCK CRANE **181**

Technical portfolio covers features and capabilities of recently introduced 25-ton capacity truck crane. Gives data on outstanding features as well as operating specifications of each front end attachment, supported by capacity charts, dimension drawings, a crane range diagram, cutaway photographs, and on-the-job illustrations. *Harnischfeger Corp.*

COATINGS **182**

Protective surface coatings for concrete, masonry and metals are the subject of this bulletin. Describes advantages of using the coatings in cutting plant maintenance costs. Includes data on application, chemical resistance and physical properties. *Hodges Chemicals Co.*

LAB EQUIPMENT **183**

Steel laboratory equipment and furniture described and illustrated in this 64-page volume includes center, wall, auxiliary, balance and combination tables. Complete information is given on construction, manufacturing and finishing details of all units, together with numerous reference installations. *Metalab Equipment Co.*

PUMPS **184**

Effectively illustrated, this 20-pager is devoted to pumps for handling practically anything from free-flowing liquids to abrasive slurries. Explains how the pump works; contains information on pump selection and application data. *Robbins & Myers, Inc., Pump Div.*

ALUMINUM FORGINGS **185**

Answers to the most often asked questions about aluminum forgings are contained in this brochure. Explains how aluminum forgings are made, difference between aluminum and steel forgings, strength of aluminum forgings and covers the most common problems encountered in forging aluminum. *Reynolds Metals Co.*

LIGHTING **186**

Data about a high-output rapid-start lamp that provide 25 per cent "up-light", increasing illumination as well as visual acuity for the industrial worker. Covers scope, construction, finish, wiring, installation, and charts photometric performance. *Day-Brite Lighting, Inc.*

MINIATURE VALVES **188**

A new series of miniature two-way valves that have been specifically designed for high capacity in a small envelope size are described in this bulletin. The illustrated brochure supplies specifications, covers outstanding features, optional features and dimensions. *Airmatic Valve, Inc.*

CASTERS **189**

A quick guide to industrial casters is contained in this bulletin. Covers 17 series of truck casters ranging in load capacity from 125 lbs to 15,000 lbs each. Includes illustrations and information on special application casters such as V-grooved, spring-action, grease-sealed and scaffold types. *Faultless Caster Corp.*

INDUCTION FURNACES **191**

A new, modern metal-melting process that improves tensile strength and machinability is described in this 12-pager. Includes charts, photos, and cross-sectional diagrams of Hevi-Duty-Tagliaferri 60-cycle induction melting and receiving furnaces. *Hevi-Duty Electric Co.*

POWER TOOLS **192**

Completely revised 96-page catalog of industrial power tools and accessories contains specifications, listings and descriptions of accessories. Action photos and drawings supplement the text. Includes new 20-inch and 17-inch power feed drill presses, new 12-inch cut-off machine and 7-inch standard grinder. *Rockwell Mfg. Co., Delta Power Tool Div.*

BUYING FORK LIFTS **193**

Important factors to consider when buying a fork lift truck are detailed in step-by-step fashion in this bulletin. Such points as capacity in pounds, load centers, types of masts, helpful lift accessories and many other features are analyzed. *Towmotor Corp.*

SPRAY SYSTEMS **194**

New airless hydraulic spray equipment for industrial maintenance or production painting is described in this brochure. Contains specifications on four units including two portable units on elevator and truck assembly, a model designed for 55 gallon containers; and a portable utility unit. *Lincoln Engineering Co.*

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SPECIFICATION BRONZES 195

Forty-two specification bronzes plus heat treated variations are described in this 12-pager. The alloys, classified in 11 basic categories, include commercial aluminum bronzes, tin bronzes, manganese bronzes and high conductivity alloys. Lists nominal chemical and average physical properties, available forms, Government and Society specs which the alloy meet and some typical applications. *Ampco Metal, Inc.*

PORTABLE TESTING 196

Complete data on various models of portable testing machines including accuracies, ranges, and features are presented in this catalog. Among types listed are matched a-c and d-c industrial meters, a portable current transformer for use as an a-c multiplier and highly sensitive d-c portables especially suited for lab needs. *Daystrom Inc., Weston Instruments Div.*

DISC GRINDING 197

The latest developments in high-production, precision disc grinding machines are shown in this new 28-page catalog. Models are shown for grinding an almost infinite variety of parts, from gauge blocks and bathtubs to coil springs and cylinder heads. Materials ground include ferrous and nonferrous metals, rubber, glass, concrete, carbide and others. *Besly-Welles Corp.*

FLOOR TRUCKS 198

Twenty-eight page booklet is devoted to two-wheel trucks and dollies. Contains illustrations and complete specifications on 130 different models in many sizes with a wide variety of different types of running gear. Also included are major factors to consider when choosing floor trucks, data on capacities, dimensions and weights. *Nutting Truck & Caster Co.*

NEW WELDING PROCESS 199

Bulletin describes vapor-shielded arc welding and new semi-automatic "Innershield Squirt" and full automatic Innershield welders. Typical process applications are illustrated. Performance characteristics and process speeds are compared with manual shielded arc and semi and full automatic submerged arc welding. Covers construction details and mechanical features. *Lincoln Electric Co.*

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SPECIAL MANUALS

Magnetic Adjustable Speed Drives **211**

Bulletin describes in detail the basic components of the magnetic drive, theory of operation, controls, design features and applications. Features discussed include stationary field coil construction, liquid or air cooled clutch system and an AC Tachometer generator. *Louis Allis Co.*

Horizontal Right Angle Speed Reducers **212**

Basic information about a new series of right angle horizontal speed reducers is given in this 20-page booklet. Includes data on selection, service factors; horsepower, thermal and torque ratings; overhung load instructions and ratings; dimensional data and reducer weights. *Falk Corp.*

Roller Chain Drives **213**

Profusely illustrated 116-page manual illustrates typical roller chain drive applications in a wide range of industries. The book covers stock roller chain drive selection with complete engineering data such as chain length calculations, conversion tables, and horsepower ratings. Covers stock sprockets and a description of types. *Diamond Chain Co., Inc.*

Speed Reducers **214**

A 96-page book devoted to speed reducers discusses torque and horsepower, efficiency from self-locking worm gearing, service factors, selection and application. Covers shaft arrangements, double reduction reducers, "low base" reducers, helical primary double reduction, plus a detailed index for easy reference. *Morse Chain Co.*

Shaft-Mounted Reducers **215**

Bulletin describes design and construction features of speed-reduction drives, offset speed reducer and screw-conveyor drives. Presents selection information, service classifications, dimensions, mounting dimension tables, and application data. *American Pulley Co.*

Mechanical Variable Speed Drives **216**

This 120-page manual is devoted to a newly introduced mechanical variable speed drive of the integral type. Describes exclusive engineering features, design improvements; includes speed and horsepower tables and complete engineering data. Profusely illustrated. *Western Gear Corp., Industrial Products Div.*

Compact V-Belt Drives **217**

The advantages in compactness and construction features of V-belt drives for requirements from 1 to 1500 hp are described in this 40-page booklet. Contains instructions for selection of standard drives for standard motor speeds and for non-standard motor speeds or for speed-up drives. *Dodge Mfg. Corp.*

Chain Drives **218**

Booklet explains how to select stock industrial chain drives. Outlines data required for selection and lists four steps of selection procedure. The well-prepared booklet also includes examples of problems and complete new ARSCM horsepower ratings. *Chain Belt Co.*

Fan-Cooled Speed Reducers **219**

The advantageous feature of increased horsepower obtained through the use of fan-cooled worm gear speed reducers over standard reducers is discussed in this bulletin. Covers other advantages of the newly introduced fan-cooled speed reducers including smaller size. *Cleveland Worm Gear Div., Eaton Mfg. Co.*

Grommet V Belts **221**

Brochure is devoted to the outstanding features of grommet V belts. Discusses flexibility, increased grip, and ability to withstand shock. Describes construction, special V belts and outlines a detailed procedure of how to figure a V belt drive. *Goodall Rubber Co.*

Worm Gear Speed Reducers **222**

Comprehensive 70-page handbook covers the design and selection of worm gear reducers of all types. Covers construction features, specifications, procedure for selecting units, lubrication, service factors, and a table of load characteristics. Includes schematics and dimensional data, rating tables, overhung load and vertical thrust capacity and torque control data. *Philadelphia Gear Corp.*

Drive Design **223**

Sixty-page illustrated manual opens with discussion of rope V-belts, advantages of their use, and installation and maintenance data. Sections are devoted to drive selection; drive design and horsepower ratings, service level and special drives; grooves sheave data; drive tension; and a drive design and selection example. *Gates Rubber Co.*

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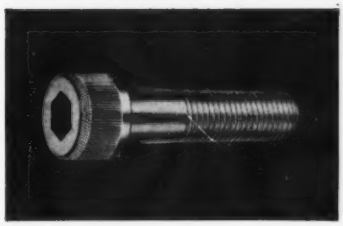

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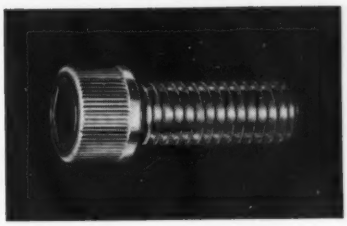

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UNBRAKO K16 tension fasteners now replace specials in high fatigue service. They give you *twice* the fatigue life of regular UNBRAKOS; *four* times that of ordinary socket heads—this in a *standard* fastener. Threads rolled, fillet under head cold worked—both after heat treat. Sizes #8 to ½ in. in 8740 A.Q. steel. pHd head, Hi-Life thread.

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High Strength Synthetic Cord Belt **224**

A drive that combines the best features of flat belts with those of V belts is described in this bulletin. Outlines and illustrates advantages of the drive, application range and limitations and includes several pages of application photos with descriptive data on each operation. *Manhattan Rubber Div., Raybestos-Manhattan, Inc.*

Lube-Free Variable Speed Drive **226**

A variable speed drive that eliminates lubrication maintenance problems is described and illustrated in this booklet. Explains the lube-free construction and other features of integral drive types and modifications; and fractional horsepower types and modifications. Also covers remote control systems. *Sterling Electric Motors, Inc.*

Automatic Centrifugal Clutches **227**

Application and operational data on three standard clutch types most commonly used is presented in this brochure. Covers adaptations to pulley, sprocket, gear or coupling drives. *Fairbanks, Morse & Co., Magneto Div.*

Torque-Arm Speed Reducers **228**

This 60-page engineering bulletin discusses the advantages and construction of torque-arm reducers, flange mounted reducers and screw conveyor drives. Lists applications by a class number for selection of reducer size; contains application photos and recommended V-belt drives. *Dodge Mfg. Corp.*

Adjustable Speed Magnetic Drives **229**

Catalog about electric power apparatus includes description of an Ampli-Speed magnetic drive that provides wide range, accurate speed control for fans, pumps, centrifugal compressors and blowers, and for constant torque loads. *Electric Machinery Mfg. Co.*

Helical Gear Speed Reducers **231**

Information on helical gear speed reducers is contained in this 20-pager. Provides complete selection data on 20 reducer sizes in double, triple and quadruple reductions. Includes tables of load classes and service factors, horsepower and torque ratings, dimensions, overhung load for high and low speed shafts, mounting arrangements and a resume of construction features. *Link-Belt Co.*

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Packaged Drive System **232**

Bulletin about a packaged drive system that maintains the flexibility of a custom engineered system. Shows how through the use of standard components, the system can be designed to meet any automatic drive requirements. *Reliance Electric and Engineering Co., Reeves Div.*

Electrical Adjustable Speed Drives **233**

Bulletin contains complete specifications, design and construction details, operational, installation and application information on electrical drive up to one-third horsepower maximum. Sketches show a wide variety of system variations. *Cleveland Machine Controls, Inc.*

Machine Drives for Fast Stop-Start Cycles **234**

Brochure describes newly introduced variable-power machine drive units with direct coupler reducer, with variable speed pulley and with timing belt connection. Discusses clutch-brake applications, fast start requirements, slip-clutch applications and pulsating loads. *Ferguson Machine Co.*

One-Piece Gear and Pinion Combinations **235**

Catalog describes newest combinations of die cast zinc alloy, one-piece gear and pinion combinations to solve transmission problems involving small, light-load gearing. Lists applications and includes engineering drawings and tables showing pitch, number of teeth, pitch diameter and other important dimensions. *Gries Reproducer Corp.*

V-Belt Drives **236**

This 64-page technical catalog presents complete instructions and engineering data for selection of both stock and non-stock drives. Gives specifications of standardized quick-demountable sheaves with interchangeable tapered, split bushings. Also includes specifications of multi V-belts of standard, super and steel-cable construction. *Fort Worth Steel & Machinery Co.*

Machine Drive System Components **237**

First section of this illustrated catalog is devoted to an electro-magnetic cycling drive unit for start-stop control of machine motion. A second section describes electromagnetic clutch-hub and clutch-sheave drive units and the final section contains engineering sheets describing the cycling unit power supply controls. *Cycledynamics, Inc.*

Eddy-Current Equipment for Speed Control **238**

Well illustrated 16-pager explains principles of operation of eddy-current couplings, drives and brakes, and magnetic friction clutches and brakes. Describes a drive "package" with an electron control and pushbutton panel. Also gives data on an electronic control system for use with eddy-current equipment. *Eaton Mfg. Co., Dynamatic Div.*

Pre-engineered Industrial V-Belt Design **239**

This 60-page V-belt design manual opens with a discussion of V-belt drives and use of idlers. Includes drive selection tables with instructions on how to use the tables. Also covers non-standard drive instructions, a design sheet and horsepower ratings. *American Biltrite Rubber Co., Boston Woven Hose & Rubber Div.*

Roller Chain **241**

Bulletin covers outstanding features of Bowman chain, including a reduction in wearing surfaces, wearing parts, greater bearing area and more pin capacity. Contains complete details. *Jeffrey Mfg. Co.*

Speed Variator **242**

Booklet describes new speed variator, a compact packaged adjustable speed d-c motor drive that operates from a-c power. Lists a wide variety of drive applications and outlines features of the new drive. *General Electric Co.*

Variable Speed Motor Pulleys **243**

The design and construction of motor pulleys that convert any constant speed drive to infinitely variable speed drive is outlined in this booklet. Explains operation and application in widely diversified installations. Discusses drive selection and includes complete technical and engineering data. *Gerbing Mfg. Corp.*

Wide Range Motor Speed Control **244**

Booklet about systems for remotely controlling the speed of an electric motor or motors over a wide speed range with either manual or automatic controls. Models described include: sub-fractional, full wave, integral, precision, automatic take-up and synchronized. *Electro Devices, Inc.*

Roller Chain Drives **245**

This 88-pager opens with a discussion of the advantages of roller chain drives and contains complete technical data on roller chains and sprockets. A section devoted to chain drive engineering covers selection, installation, chain length calculation and a chain length conversion table, horsepower and speed ratio tables. *Cullman Wheel Co.*

Helical Gear Reducers for Pumps **246**

Bulletin illustrates and describes new series of heavy-duty pumps available with a new series of helical gear reducers. The helical gear reducers are also applicable as individual items for general use. *Viking Pump Co.*

Drive Catalog **247**

Handy 664-page pocket-size catalog contains wealth of information on drive design and maintenance. Book is full of engineering tables, formulas, selection charts and horsepower ratings for helical gears, worms and worm gears, chain and sprockets. Ratio motors for small power packages, miter gear units, reducers and variable speed drives. *Boston Gear Works.*

V-Belt Clutch **248**

A comprehensive illustrated catalog of standard, custom and advance design lever action clutches for V-belt drive application. Emphasis in the catalog is on the ease of selecting the proper clutch to do the job required. *V-Belt Clutching Co.*

Timing Belt Drives **249**

Engineering data for stock timing belt drives is contained in this 56-page manual. Covers selection procedure, installation information, horsepower capacity ratings and selection tables. *R. & J. Dick Co.*

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Roller Chain Flexible Couplings **251**

Brochure describes flexible couplings for connecting two shafts, a reducer, or a motor directly to a machine for efficient power transmission. Covers selection, advantages and dimension in inches of stock flexible couplings. *Acme Chain Corp.*

Speed Reducers **252**

Spiral-bound 175-page handbook covers eight types of speed reducers in a wide range of ratios and capacities including single and double reduction, horizontal and vertical types, for most any speed reduction application. *Grant Gear Works, Inc.*

Spiral Bevel Speed Reducers **254**

Booklet opens with a description of gear production and quality control facilities, covers general specifications, selection procedure, load characteristics, lubrication and schematics and dimensions of spiral bevel reducers of all types. Typical installations are illustrated. *Philadelphia Gear Corp.*

Instrument Drives **255**

Booklet contains descriptive data and illustrations of instrument drives, geared adapters, tachometers, clutches, flexible shafts and actuators. Includes helpful information about a complete tachometer drive installation. *Actuator Products, Div. Geartronics Corp.*

Stepless Variable Speed Drives **256**

Advantages and special features of stepless variable speed drives for fractional horsepower applications are presented in this 16-pager. Typical applications are both listed and pictured. Operating features and installation suggestions are accompanied by numerous diagrams and tips on power transmission. *Zero-Max Co.*

Drives **257**

Catalog contains 36 pages of basic data on series of shaft mounted bevel gear units, worm gear speed reducers, spur gear drives and right angle bevel gear speed changers. Includes dimensional schematics of models in each series, descriptions, applications, specifications, construction features, recommended horsepower and torque ratings. *Hub City Iron Co.*

Engineering Handbook for Multi V Belts **258**

This 76-pager opens with a discussion on correct selection of a Multi-V drive. Contents cover idler data, formulas, installation and care of V belt drives, how double matching of V belts works and principles of V belt design. Also discusses selection of a pre-engineered V-V drive, and the designing of a standard V-V drive, a V-Flat drive, a Multi V quarter turn drive and a Double-V belt drive. *Goodall Rubber Co.*

Gear Reducers **259**

Features of a series of gear reducers in heat-treated alloy of aluminum housings are discussed in the opening pages of this brochure. Tabulates ratings of single worm reducers, double worm reducers and single worm-single planetary combination reducers. Includes data on mountings, selection information and drawings of assembly and mounting positions. *Electra Motors, Inc.*

Fractional Horsepower V-Belts **261**

Table of contents of this 56-page catalog includes cross reference chart for all fractional horsepower V-belts, and of special belt numbers; lists trade names, manufacturer's part number with belt listings and applications; replacement belt sizes by length; and a belt popularity table. *Thermoid Div., H. K. Porter Co., Inc.*

V-Belts **262**

Bulletin describes outstanding features of V-belts including two-ply covers and heat-resisting rubber. Covers eight advantages of grommet V-belts, illustrating and explaining how the grommet works. Includes information on a vibrationless belt for special applications. *B. F. Goodrich*

Adjustable Speed Drivers **263**

Four types of adjustable speed drives are illustrated and fully described in this brochure. They include: a stepless, accurately controlled adjustable speed from AC power; a magnetic drive; a high performance DC adjustable speed drive; and an AC motor-driven mechanical adjustable speed drive. *Louis Allis Co.*

Adjustable Speed Drives **264**

Selection information for both standard and wide-range adjustable speed drives is contained in this 24-page booklet. Includes companion sheave dimensions for both the standard and wide-range drives, belt dimensions and fractional horsepower adjustable-speed sheave and belt dimensions. *Power Transmission Div., American Pulley Company.*

Speed Systems for Range Drives **265**

A special brochure on the application of AC controlled speeds systems to range drives for paper, fabric, plastic and metal strip. Includes schematics of applications on range drives for both tension control, and for "tensionless operation" as well as typical range drives. *U. S. Electrical Motors Inc.*

Nylon-Polymer Core Belting **266**

Booklet about a flexible, oriented nylon-polymer core belting expalins the properties, construction, and advantages of its use in the paper and lumbering industries as well as textile, milling, crushing and metal working. Includes engineering and application data, graphs to determine proper type belt, as well as charts for belt width and tension. *Extremultus, Inc.*

Parallel Shaft Speed Reducers **267**

Complete selection data for each size of a redesigned and expanded line of parallel shaft speed reducers is contained in this 36-page booklet. Covers installations, types, and construction features. *Link-Belt Co.*

Worm Gear Speed Reducers **268**

This 82-page manual contains specific information on single and double reduction worm gear reducers in ratios up to 4900/1. Discusses advantages of worm gearing and covers standard specifications. Well illustrated sections deal with proper selection; and give complete technical data on types of single worm reduction; helical worm reduction; and double worm reduction. *DeLaval-Holroyd, Inc.*

Segment Type Belt **269**

Brochure outlines ten advantages of segment type V-belting. Tables give belt speeds and horsepower ratings. Includes complete selection information and helpful suggestions for installation. *Ton-Tex Corp.*

Spiral Bevel Speed Reducers **271**

New 32-page bulletin on horizontal and vertical spiral bevel speed reducers cites advantages of design including space and operating economy. Presents data on basic types, special features of vertical types, applications, selection procedure, overhung and thrust load capacities, standard assemblies, horsepower and thermal ratings, general dimensions, backstop selection and bedplate dimensions. *Hewitt Robins.*

Drive Systems **272**

Complete new tabbed catalog listing engineering information, dimensions and other pertinent data about small electro-mechanical drive systems, timing devices, variable speed controls, speed reducers and electric motors. Includes description and illustrations of head belt drives. *Minarik Electric Co.*

Variable Speed Belts **273**

Booklet catalogs sizes and types of variable speed belts for all industrial applications. Top widths of standard sizes range from seven-eighth inch to three inches and nominal overall lengths from 26.4 to 170 inches. Includes a change over guide and also describes an adjustable link variable speed belting. *Lovejoy Flexible Coupling Co.*

Gear for Speed Increasing, Reducing **274**

Brochure about a gear for high torque power transmission applications such as boiler feed pump drives, circulating water pump drives, compressor, blower and fan drives. Includes full-page cutaway view pointing out construction features. Discusses advantages of the gear, capacity, selection curves and dimensional data. *De Laval Steam Turbine Co.*

Molded V-Belts **275**

Bulletin about a fully molded and jacketed notched V-belt developed especially for small sheave diameters and short center, high speed drives. Outlines advantageous features of the belt and suggested applications. *Manhattan Rubber Div., Raybestos-Manhattan, Inc.*

Gearmotors and Speed Reducers **276**

Gearmotors ranging from 1 to 150 hp in AGMA classes one, two and three, are described in this bulletin. Drives covered are from one to 75 hp with output speeds as low as 1.2 rpm. Lists numerous typical applications for drives requiring "slower-than-motor" speeds. *Howell Electric Motors Co.*

Shaft and Flange Mounted Drives **277**

Thirty-six page profusely illustrated manual devoted to shaft and flange mounted drives covers design and construction, use, selection and dimensions. Includes description of accessories, motor mount, bushings, sheave and belt selections, NEMA motor information and several pages illustrated typical installations. *Falk Corp.*

Wedge V-Belts **278**

The advantages of a modified version of the wedge V-belt are outlined in this illustrated brochure. Describes the three cross sections available for use on drives with moderate horsepower, small diameter sheaves and short centers; for use with average sized sheaves and sudden shock resistance; and for long, heavy duty drives where great shock loads and high tensions are encountered. *Goodyear Tire & Rubber Co., Industrial Products Div.*

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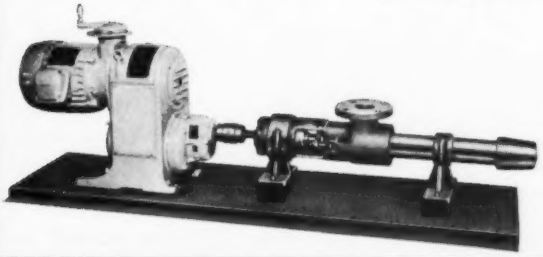
Passes particles / Pumps solvents in suspension / Low internal velocities / Metered uniform flow
Positive displacement / Self priming . . .



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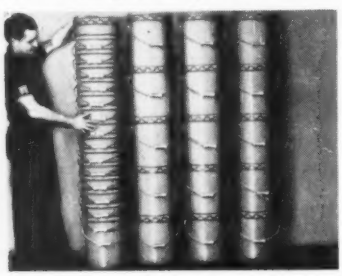
NEW EQUIPMENT

FOR WESTERN PLANT OPERATION, PRODUCTION AND MAINTENANCE

USE POSTCARD PAGE 57 *For Information on Products Described*

STEEL PAIL 279

. . . holds 5 gal., is tapered for nesting



Storage space for empty pails is reduced to one-third the space, since these new steel pails can be nested. They are easy to ship, taking less space than straight sided pails and complying with all shipping specifications. The 5 gal. tapered nesting pails are available in 28, 26 and 24 gauge steel. *Bennett Industries.*

CHAIN ASSEMBLY 282

. . . specially designed for lifting pipe, tubing, structural beams

The special pipe lifting chain assembly consists of a double leg sling chain with master link and pear shaped end links, to which are attached two specially engineered triangular members from which are suspended several dropper chains. The dropper chains can be equipped with sling hooks, dropper hooks or another type depending upon need. The assembly can be supplied with any number of dropper chains. The device serves to reduce the number of lifts needed to handle amounts of pipe, tubing or beams. *American Chain Div., American Chain & Cable Co., Inc.*

FRICTION MATERIAL 283

. . . for severe brake and clutch service

New organic friction material almost completely eliminates fading under high temperature conditions, providing positive control of brakes and clutches at temperatures up to 1000 degrees F., under high load and fast cycling conditions. Average coefficient of friction is .56 at 350 degrees, .62 at 600 degrees and .53 at 1000 degrees, while rate of wear is within acceptable limits for high friction level materials. Material is rigid and molded, containing zinc particles. It is available in blocks, facings and sheets. *Johns-Manville.*

AIR VALVES 284

. . . explosion proof, solenoid operated, 3-way and 4-way units

Valves are extremely compact, mounted on sub bases for easy maintenance. Entire valve may be released without disturbing plumbing by unscrewing four captive bolts. They are rated for 1000 cycles per minute continuous duty and at 150 psi air. Models are available in ¼ to ¾ in. pipe sizes. Valve plunger stroke is short, 3/32 in., reducing coil heating. Friction reduction in pilot valve is accomplished by using small ball which seats on O-rings at both ends of pilot cartridge but moves freely, independent of the seals. *Barksdale Valves.*

V-BELTS 285

. . . users can make their own

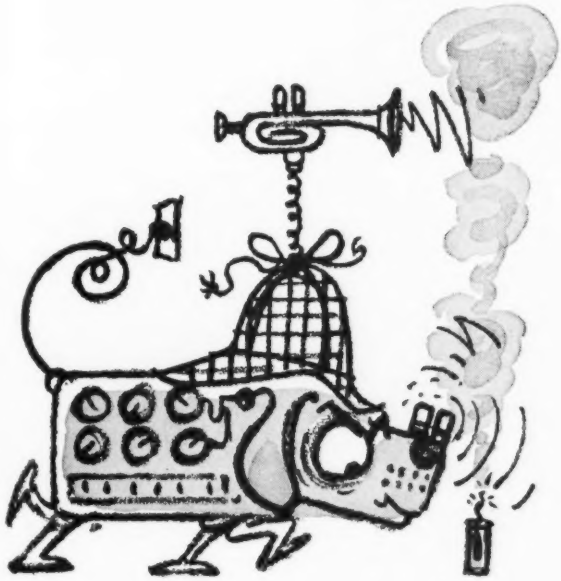
Industrial users can now make their own V-belts using V-belting cut to length and special V-belt fasteners. Depending upon amount of use, the industrial user can either obtain lengths of belting of the cross woven fabric construction type and fasteners, or can obtain a complete kit which will enable him to make from a roll of belting any length belt desired. Fasteners, used to join the belts, require use of simple application tools. Advantages of system are: less machine downtime when belt is needed and correct endless belt is not available; installation is easy since new V-belt can be made around pulleys without dismantling machinery. *Flexible Steel Lacing Co.*

MOTOR BEARINGS 286

. . . have new design improvements

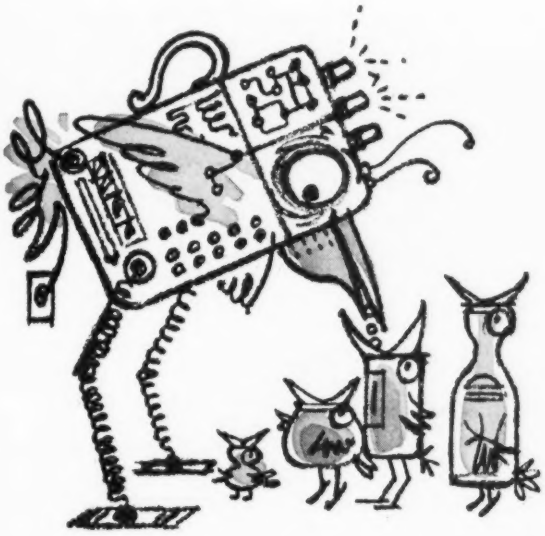
Operating temperatures of this bearing are reduced as a result of more effective lubrication due to new design changes. Bearing life has also been increased. Bearing cage construction now produces cage-roller contact at greatest distance from roller pitch diameter, reducing pressure on rollers. New tapered flange concentrates the contact area toward the outside of the roller end and at the base of the flange, the region of slowest relative motion. Roller rotation causes beneficial oil wedge to build up. *SKF Industries, Inc.*

modernize with an electronic "THINGAMAJIG"!



PHOTOELECTRIC SNIFFERS smell out smoke—then summon the fire brigade, turn off ventilation systems, turn on sprinklers, shut down equipment, even close doors.

ULTRASONIC SCRUBBERS clean tiny component parts fast. This beats slow and costly old-fashioned ways, solves problem for precision equipment makers.



AUTOMATIC FILLER-UPPERS fill all types of containers accurately and quickly—even measure and mix liquids. Perfect for beverages, chemicals, drugs, foods...

ELECTRONIC COUNTERS count anything — hippos to hula hoops... tackle practically any counting problem with ease. Lots of industries are adopting them.

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Pacific Gas and Electric Company

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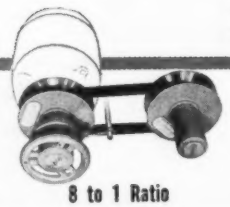
GERBING 25 HP Variable Speed Drives

SAVE 50% compared to enclosed motor drives!

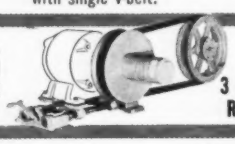
- Infinitely Variable Speed Change Ratios—Up to 8-1.
- Low Initial Cost—uses standard motor or engine.
- Maximum Efficiency. V to V.
- Compact—Easy to Install.



8 to 1 Ratio

TYPE W ROTO-CONE—FIXED CENTER DRIVE . . . mechanically operated. Turning the handwheel changes the pitch dia. of both pulleys. May be mounted in any position. HP thru 25 @ 1750 rpm with single v-belt.

No. 1325 ROTO-CONE with Adjustable Motor Base Control. Speed changes made without stopping motor. HP thru 25 @ 1750 rpm.



3 to 1 Ratio

Other size ROTO-CONE Variable Speed Pulleys are available . . . from fractional thru 25 HP. Gerbing Speed Control Engineers are at your service. Write for Catalog 660.

GERBING MANUFACTURING CORP.
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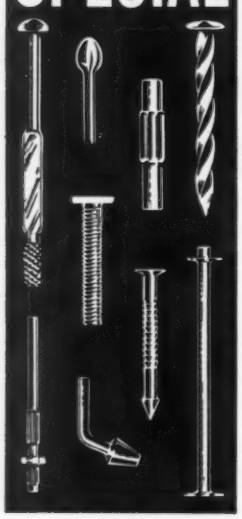
SPECIAL FASTENERS made especially for you by HASSALL COLD HEADING



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- *To Specification*
- *On Time*

A fastener is, indeed, a vital part of any product. Did you know that a fastener made to *your specifications* for *your particular application* can lower unit cost as well as assembly cost?

For proof, call on Hassall's cold heading experience for design assistance and quotation on challenging, hard-to-get or unusual fasteners. For ideas, send for catalog.

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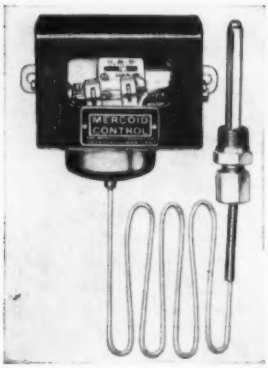
TEMPERATURE CONTROL 287

. . . is small, therefore suitable for mounting in limited space



The control is designed for various industrial applications; including air conditioning, freeze protection and refrigeration. Its small size allows mounting in limited areas or on wiring channels. Features include external adjustment, repetitive trip point, visible calibrated dial with pointer, and visible on/off hermetically sealed mercury contact. The unit can provide any of the following operations: single pole, cut in high (close on rise); single pole, cut in low (open on rise); single pole, double throw operation. *Mercoid Corp.*

CONVEYOR ATTACHMENT 288

. . . of soft rubber to cushion bruisable products

These rubber fingers are specially useful for handling fruit, vegetables and other perishables. They are available in sizes to fit all standard conveyor belts and can be installed either at the factory or on the job in a very short time. The fingers are available in various heights and are installed by cementing them upright on the belt in evenly spaced rows. *Holty Rubber Co., Inc.*

TILE REMOVER 289

. . . automatically strips tiles and flooring

Machine strips linoleum, asphalt rubber, vinyl and other tiles and flooring from wood and concrete floors over five times faster and more thoroughly than by hand. It can also be used to strip grease and dirt build-ups from factory floors, and clean up spilt materials such as plaster, glue, resins and paint. Machine contains four 3½-in. wide reciprocating steel cutter blades, which automatically adjust for minor floor irregularities. Blade angle and cutting pressure are adjustable and unit can be wheeled around plant where needed. Machine has built in grinding attachment for sharpening blades on the job and is powered by ½-hp. heavy duty motor. *American Floor Machine Co.*

LARGE MOLDED TEE 291

. . . size range increased to 8 in. dia.

Injection molded tees of unplasticized polyvinyl chloride piping now are being made in 8 in. dia. sizes. They are said to stand five to six times higher pressure and cost less than fabricated fittings. The new items make use of this type of piping in large sizes increasingly feasible for many installations where lightness or handling of corrosive materials are key factors. *Tube Turns Plastics, Inc.*

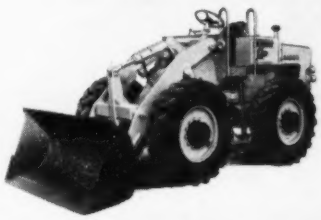
WHEELS 292

. . . steel disc type with replaceable polyurethane tires

These 6 or 8 in. clincher type polyurethane tires are designed for users of bulky wheeled equipment requiring easy rolling, resistance to corrosive elements and long life expectancy. Polyurethane rolling resistance is neglible, tires will not mark floors and are highly resistant to oils, mild acids and detergents. Wheels are of steel and cadmium plated. They are made with clincher type side plates that are easily loosened for changing tires. *Jarvis & Jarvis, Div. of United Service Equipment Co., Inc.*

TRACTOR SHOVEL 293

. . . equipped with new bucket having 25% more capacity



A new "B" version of the firm's smallest H-30 four wheel-drive tractor shovel is equipped with a 1¼ yard bucket, which provides 25% more capacity. Despite increased capacity, balance and stability of the original unit has been retained. In addition, for increased safety, the boom arms are positioned ahead of and away from the operator. The tractor also has a walk-in operator compartment, new hand rails and safety ladder, adjustable bucket seat and new transmission controls. *Frank G. Hough Co.*

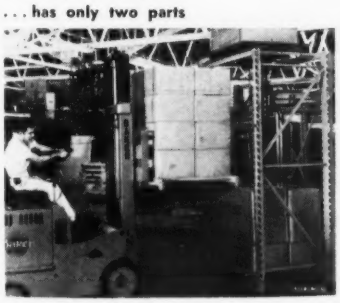
BALL VALVES 294

. . . new line designed for socket welding

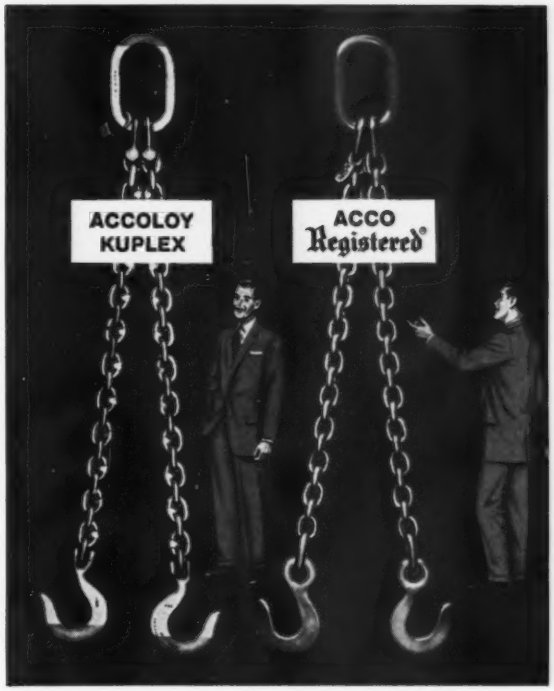
These welding end valves are particularly suitable for installations handling toxic, combustable or hazardous materials, or in other cases where leakage at the threads due to vibration cannot be tolerated. Valves come from ¼ to 2 in. in carbon or alloy steels. Ball seal and stem packing are Teflon. The body joint is seal welded, eliminating the body gasket. The stem packing can be adjusted with an ordinary wrench and the whole stem packing assembly disassembled without removing the valve from the line. *Pacific Valves, Inc.*

STORAGE RACK 295

. . . has only two parts



This new rack for pallet or bulk storage can be constructed using only two parts, uprights and load support beams. A doubly acting locking device is built into each part which rigidly locks them together. No tools or nuts and bolts are needed. The racks can be easily rearranged to suit storage requirements. Accessories are available to provide storage for dies, skids or drums. *Green-Penny Co.*



One of these sling chains will meet your most exacting needs

One-day delivery is forthcoming when you specify ACCOLOY KUPLEX Sling Chains. Made up locally by an authorized KUPLEX distributor, these slings feature matched Accoloy steel components, which have been proof-tested at the factory at twice working load limits. Assembled from Drop-Forged Shaped Masterlink, Kupler and Hook plus Accoloy 125 chain, they're available in six chain sizes (¼" to ⅞") in single, 2-leg, 3-leg and 4-leg styles.

Factory-built all-welded construction is assured when you buy ACCO *Registered* Sling Chains. Accoloy 125 chain is welded under scientific control and heat-treated to optimum strength levels. Registration ring and certificate—signed by ACCO—attest to successful test performance of the sling.

See your local distributor for ACCO *Registered* or ACCOLOY KUPLEX sling chains. If you don't know his name, contact any of the American Chain sales offices listed below for further information.

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Service Station facilities for repair of all types of sling chains available at our San Francisco warehouse

AMERICAN CHAIN

American Chain Division
American Chain & Cable Company, Inc.

ACCO Bridgeport, Conn. • Factories: *York and *Braddock, Pa. *San Francisco, Calif.

Sales Offices: *Atlanta, Boston, *Chicago, *Denver, Detroit, *Houston, *Los Angeles, New York, Philadelphia, Pittsburgh, *Portland, Ore., *San Francisco

***Indicates Warehouse Stocks**

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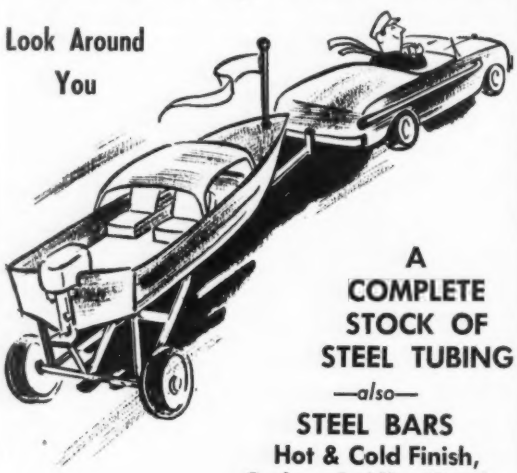

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AUTOMATIC SCRUBBER-POLISHER **296**

. . . cleans 30,000 sq. ft. per hour

Designed for use in factories and other buildings with large open areas, the machine in one pass over the floor, lays the cleaning solution, scrubs a 45-in. swarth, vacuums up the dirty solution and dries the floor. It also can be used to polish a 45-in. swarth while simultaneously vacuuming up dust and dirt. The unit has a 7 hp gasoline or propane engine and goes forward or in reverse in a fully variable speed range of from zero to 185 ft. per minute. *Advance Floor Machine Co.*

TROUBLE DETECTOR **297**

. . . portable electronic unit amplifies machine sounds

This transistorized amplifier is battery operated and can be carried in a pocket. It comes with a chrome plated sound absorption rod and can be used with a personal earphone to identify faint vibrations and detect abnormal machine sounds and make adjustments before real damage is caused. Device is inexpensive and suitable for use by maintenance men, engineers and machinists. *Calhear Instruments Co.*

STORAGE RACK **298**

. . . new idea for storing sheet metal

Sheet metal is placed on special pallet made of rugged square tubing, which is supported on short cantilever arms that attach to posts. As each upright frame has three posts, pallets are supported at six places. Space is saved by eliminating the full length stringers except at the top and bottom levels where they serve as tie bars. Cantilever arms are attached without bolting and are quickly adjusted to any new level. *American Metal Products Co., Storage Rack Div.*

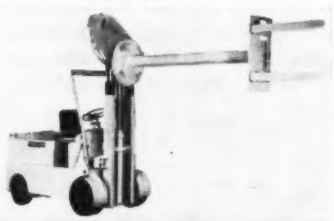
TUBING BENDERS **299**

. . . six new sizes for copper, aluminum, brass and stainless

The benders, in sizes to accommodate tubing from 3/16 to ½-in. OD, are specially made for easy application and removal when working with tubing already installed or where access is difficult. Design also permits tool to be removed at any point in the bend. Bends may be formed for any precise angle up to 180 degrees. Forming shoes and rolls are of high-grade steel to prevent marring and deformation during bending. *Ridge Tool Co.*

FURNACE CHARGING **311**

. . . with specially equipped lift truck



This 96-in. special furnace charger ram can convert a standard model 670 series fork lift truck into a special piece of equipment suitable for use in foundries and other installations of this type. Ram is bolted to chain-driven rotator that revolves ram and forks a full 360 degrees. If desired U-locked standard 36-in. forks can be replaced quickly with 42-in. forks giving unit a lifting capacity of 8700 lbs. Other available accessories include tire guards and heat shield. *Towmotor Corp.*

WIRE REEL TIPPER **312**

. . will turn 42-in. reel weighing 5000 lbs.

The reel turnover device can be loaded from either side by a fork truck or overhead crane or hoist. Rotation is accomplished in 20-23 seconds through an electro-hydraulic power unit that supplies fluid to a double-acting hydraulic cylinder. Overtravel in either direction is prevented by limit switches and the control switch is remotely mounted for safety. *West Bend Equipment Corp.*

SWITCH LOCKING COVER **313**

. . . attachment fits any metal wall plate

This safety device is equipped with a tumbler lock and a set of keys, and assures positive control of electrical switches. The switch locking cover attachment will fit on any wall plate and can be quickly and easily installed over an existing flush toggle switch. It is available also in master keying and straight keying systems. *Harvey Hubbell, Inc.*

Western MANUFACTURING NEWS

PLANTS — PRODUCTION — DISTRIBUTION — PERSONNEL

Conveyor Belt Maker Building New Plant

CANON CITY, COLO. — Ground was broken recently for a $60,000 plant of Fry & Co., a local firm which manufactures a conveyor belt system for distributing baggage to plane passengers, and a jeep loader for delivering baggage into a plane, according to *Ed Fry*, head of the firm.

The new building will be of steel 80 by 200 ft. on approximately five acres in the new industrial park south of the city. The plant employs 15.

Scheduled for completion in October, the new structure will provide overhead suspension and other technical advantages over the building taken when the company moved here in March 1957 from Cripple Creek, Colo.

Georgia-Pacific Slates Huge Container Plant

PORTLAND — *Robert E. Flowerree*, president of Georgia - Pacific Paper Co., here, has announced plans to build a new container plant in northern California at a site yet to be selected. Simultaneously Flowerree announced the purchase of White Containers, Inc., of Monticello, Iowa.

The new corrugated container plant will be similar to the one recently opened by Georgia-Pacific at Olympia, Wash. Plans call for a 78,000 sq. ft. structure with an ultimate capacity of 45,000,000 sq. ft. a month on a three-shift basis. Employment would be created for up to 60 people.

Mirra-Cote Co. Expands Production Facilities

EL SEGUNDO, CALIF. — Mirra-Cote Inc. has expanded its plant facilities to accommodate the needs of electronic, hardware and appliance manufacturers with a fully integrated plant devoted to design, tooling and injection molding of metallized and resin coatings.

U. S. Engineering Adds Plant, Lab Space

VAN NUYS, CALIF. — An addition totaling 4000 sq. ft. has been made to existing facilities at U. S. Engineering Co., Div., Litton Industries.

Expanded were engineering facilities for about 2000 sq. ft. that included environmental, materials research, metallographic and experimental circuit plating labs, an engineering library and offices.

About 1000 sq. ft. has been allotted to storage of in-stock items and an equal amount for plant administrative offices. The firm designs and manufactures printed and plated circuits, terminals and electronic hardware. Complete manufacturing facilities now total about 30,000 sq. ft.

Sacramento Marble-Lite, Inc. Leases Manufacturing Space

SACRAMENTO, CALIF. — President *Seymour Berger* of Sacramento Marble-Lite, Inc., here, has announced the leasing of space from Warren Electric for the manufacture of a new product, pre-cast marble.

The firm is a manufacturing franchise-holder for the Marble-Lite Chemical Products Co. of Southern California. *Jim Zetz* will be in charge of production.

Aircraft Products Business Acquired by General Metals

LOS ANGELES—General Metals Corp., industrial subsidiary of Transamerica Corp., has announced acquisition of the aircraft products business of Gladden Products Corp., Glendale, Calif.

William E. Butts, General Metals' president, said the acquisition includes lines of hydraulic and pneumatic components for aircraft and missile, the production of which will be continued from the General Metals Adel Div. plant at Burbank, Calif. Technical and production personnel engaged in their manufacture at Glendale will continue that activity for General Metals at the Adel plant.

Gladden's other subsidiary companies were not included in this transaction, Butts said.

The Adel Div. of General Metals specializes in the design and manufacture of hydraulic, pneumatic, fuel and electro-mechanical systems and power generating packages for aircraft, missiles, rockets and ground support applications. The combined operation will continue to specialize in these fields, Butts said.

During the past 18 months, General Metals has completed the enlargement of its facilities in Houston, Tex., and in the San Francisco Bay Area has integrated the Enterprise Div. with its iron and steel facilities in Oakland. The Enterprise Diesel Engine Div. at Oakland produces Diesel engines for stationary power plant and marine application.

Rocky Mountain Rubber Establishes New Plant

DENVER — Rocky Mountain Rubber Manufacturing, Inc., manufacturer of custom molded rubber products for industry, has established a new plant at 1887 W. Evans Ave.

Heading the firm is *John B. Gubbins*, president and treasurer.

Stauffer Dedicates Key Unit of New Research Center

NO. 1
Hans Stauffer, left, president of the Stauffer Chemical Co., cuts the ribbon while Dr. Chester L. Arnold, vice president, research, looks on at recent dedication of the new main laboratory and administration building at Richmond Research Center.

NO. 2
More than 400 attended the dedication, including the more than 100 scientists who staff the new 53,000 sq. ft. research center. Other guests were civic and county officials, scientists from nearby universities and industrial research laboratories.

RICHMOND, CALIF. — Stauffer Chemical Co. recently dedicated the new main laboratory and administration building at its Richmond Research Center, here.

The new building, which is the central key unit of the complex of research buildings which the company is constructing on the 16-acre site, houses 25 individual laboratories, technical library, conference and meeting rooms, administrative offices, lunchroom and service facilites.

Laboratory sections are concerned with research on polymers, catalysts, agricultural chemicals, organic chemicals, inorganic chemicals, fluorine chemicals and analytical procedures. In adjacent buildings research is carried on in the development of refractory metals, process development, engineering and design and pilot plant studies.

The new main laboratory has been designed so that it can be expanded and integrated with additional buildings now in the planning stage.

Manganese Plant Closed in Nevada

HENDERSON, NEV. — Manganese, Inc., for many years a major mining and processing operation in southern Nevada, has laid off its employes and closed down, according to Manager *E. B. Douglas.*

Alcoa Building $325,000 Facility at Burlingame

BURLINGAME, CALIF. — Aluminum Company of America broke ground last month for its new $325,000 San Francisco District sales office in Burlingame, according to *Edwin M. Tatman,* district sales manager.

The 10,000 sq. ft., contemporary structure will use the latest standard aluminum architectural shapes and will be located on Ogden Avenue in the Mills Estate.

It will serve as a sales and distribution point for Alcoa's general products line for the area from Santa Barbara County north to the Oregon border and will replace offices the company has occupied for the last five years in the Equitable Life Bldg., 120 Montgomery St., San Francisco.

"This is the final step in an expansion and reorganization program designed to meet the growing demands of the expanding Western market," Tatman said.

"This program has resulted in the opening of an office in Oakland to service Alcoa's customers in the East Bay and in the opening of the Rome Cable Division in Utah's South San Francisco Industrial Park to provide a central distribution point for the company's cable conductor and other electrical products.

"The Burlingame office will provide the enlarged quarters needed for Alcoa's general products line, including necessary parking facilities and room for future expansion."

Automation Occupies New Boulder, Colo. Facility

BOULDER, COLO.—A new ultra modern plant facility here has been occupied by Automation's Magnetics Div., according to *Corwin D. Denney,* president of Automation Industries, Inc.

The facility was designed specifically for the development and manufacture of technically sophisticated foil and wire magnetics components for aircraft, missile, space capsule, and advanced laboratory applications. Quality control and manufacturing areas are temperature and humidity controlled and assembly areas are pressurized as well as air conditioned.

The Boulder facility brings Automation's total plant space to approximately 150,000 sq. ft., Denney said. Automation Industries, Inc. has facilities at Manhattan Beach, Calif.

Burton Mfg. Acquires Technical Plastics

LOS ANGELES — Burton Manufacturing Co., of Northridge, Calif., acquired Technical Plastics, Inc. of San Mateo, Calif., is was announced recently by *William J. Miller,* president of Burton.

The acquisition, he pointed out, is the first step in an expansion and diversification program outlined to Burton shareholders at their annual meeting last May.

Barney Bristow, president of Technical Plastics, said the company will continue to operate in its present San Mateo facility as a division of Burton.

Technical Plastics specializes in the field of extreme temperature plastics, producing missile skin fairings, telemetering antenna windows, flame shields, epoxy molds, thin-walled cylinders, and other products applicable to many of the nation's missile projects.

Burton's product lines range over a diversity of markets from aircraft instruments and electronic components to medical equipment.

Cleveland Crane Establishes Tramrail Div. Plant at LA

LOS ANGELES—The Cleveland Crane & Engineering Co., Wickliffe, Ohio, has established a West Coast Tramrail Division with plant at 6435 Corvette St., here.

Located in the Central Manufacturing District, the plant will provide fast service for Cleveland Tramrail overhead materials handling equipment in the Western states. It is equipped with engineering and shop facilities.

Standard equipment will be assembled and stocked. Limited manufacturing also will be carried on as required to enable "tailoring" of special equipment to unusual materials handling situations.

Karl Pamer is manager of the division.

Industrial Finishing Systems Occupies New, Enlarged Plant

GLENDALE, CALIF. — Moved into new and enlarged facilities at 517 W. Garfield Ave., is Industrial Finishing Systems, Div., Industrial Handling Systems.

The firm designs, engineers and manufactures complete finishing systems, ovens, conveyors, infra-red and spraying equipment.

Northwest Petrochemical to Expand Production

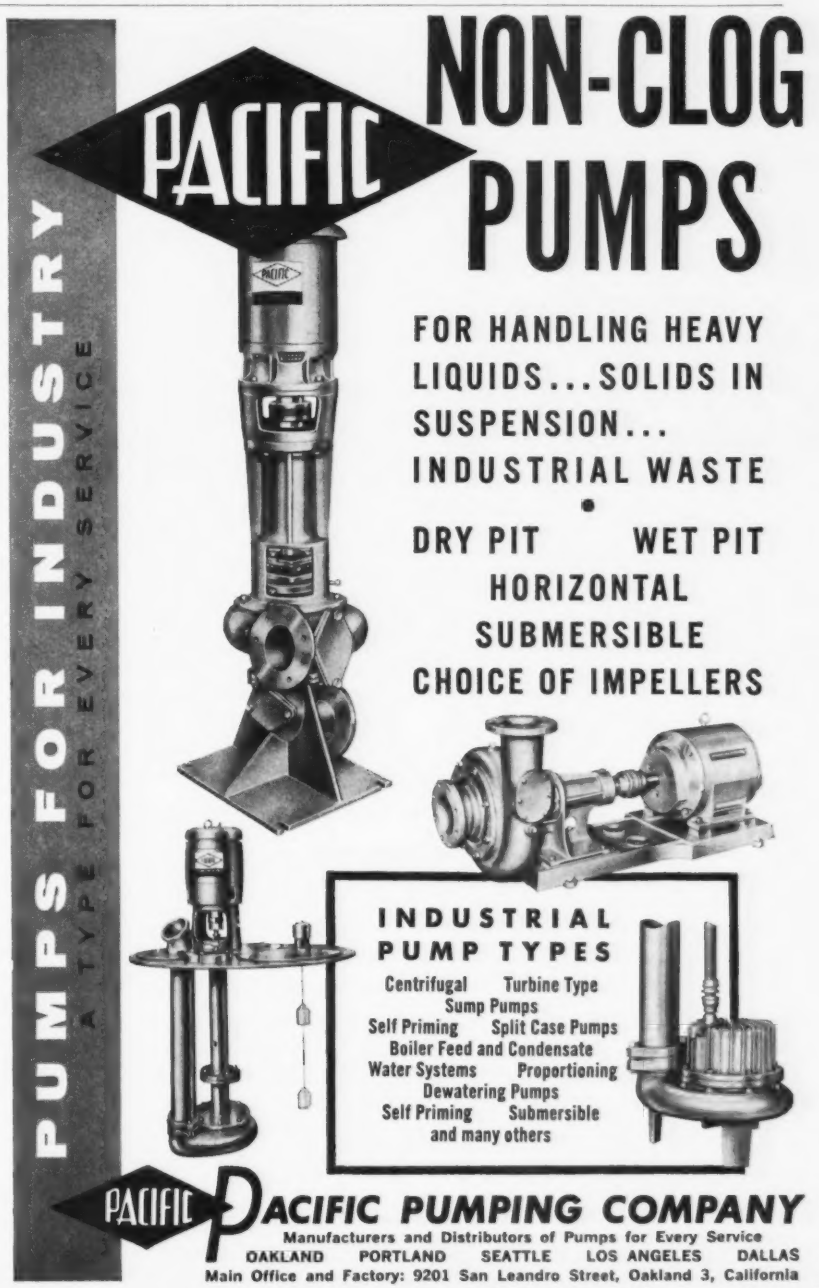
ANACORTES, WASH. — New contracts signed with midwestern oil refineries will result in increased production and the installation of additional machinery at the Northwest Petrochemical plant here, according to *A. C. Ash,* president.

By-products from the oil refineries will be brought here in additional quantities for use in the manufacture of plastics, resins, chemical intermediates and gasoline additives, Ash said.

Sunbeam Lighting Appoints Washington Representative

LOS ANGELES — *Henry Gluck,* vice president in charge of sales for Sunbeam Lighting Co., Los Angeles and Gary, Ind., recently announced the appointment of *Charles J. Dutcher* to represent Sunbeam Lighting throughout the State of Washington.

Dutcher, who has a background as a lighting representative and consultant in commercial, institutional and industrial lighting, has offices at 444 Dexter Horton Bldg., Seattle.



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Arizona Leads West In Electronic Sales

PHOENIX — The electronics industry in Arizona led other districts in the 11 Western states in sales gain between 1959 and 1960, according to the Western Electronic Manufacturers Association.

WEMA statistics show that Arizona sales gain in electronics was 44% during the 1959-1960 period compared to a 23% gain in San Diego; 11% in Los Angeles; 18% in the San Francisco Bay Area; and 18% in the Seattle-Portland district.

Total sales in the Arizona electronic industry in 1960 reached $120,000,000, and this is expected to increase to $165,000,000 this year. Some 11,000 persons are employed in the industry in Arizona, mostly in the Phoenix area.

The WEMA trade association group has 320 member companies and is currently forming a council in Phoenix.

Weyerhaeuser Regroups To Strengthen Selling

TACOMA, WASH.—Embracing a new service-oriented sales program, the Weyerhaeuser Co. has consolidated all lumber, plywood, door and panel divisions and is transferring sales authority to local market areas, Executive Vice President *George H. Weyerhaeuser* announced recently.

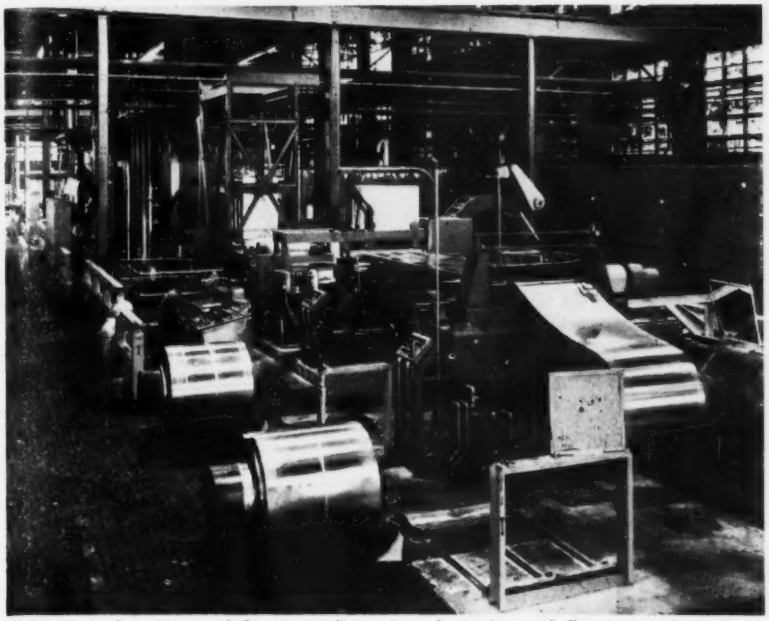
"This is a basic shift from commodity selling of lumber to end-user marketing of wood products," he explained. "We're making it easier for customers to buy our products and preparing to supply the products which best meet market demands."

The company's sales force has been expanded to about 350 through recent diversification and is being tailored to intensive selling and personal service. "Previously, each salesman sold only a few of our products and called on many customers; now, most Weyerhaeuser representatives will offer broad lines of products," Weyerhaeuser explained. "And the territory covered by each man will be smaller so he can be of greatest assistance to buyers."

Wood products division is the name of the new unit headed by Weyerhaeuser. Other management members of the division include *John L. Aram*, vice president, marketing, and *Jon. R. Titcomb*, vice president, manufacturing, Western Region.

← . . . *for more details, circle No. 56*

Kaiser's New Aluminum Coil Processing Facility



Aluminum coil is processed for can makers on a degreasing and flattening unit at Kaiser Aluminum & Chemical Corp.'s Trentwood, Wash., Works. The unit, which operates at speeds up to 600 feet per minute, is a portion of an over-all can stock processing facility which has been installed at the plant.

TRENTWOOD, WASH. — A major, fully-automatic facility to process aluminum sheet and coil for the nation's can manufacturing industry has been completed by Kaiser Aluminum & Chemical Corp., here.

Installation of the specially designed multi-million dollar can stock finishing line, first of its type in the Unted States, follows a two year construction and development program, *W. J. Edmunds*, general manager of the company's Industrial Div., said.

"Use of aluminum for cans in the food, beverage and industrial fields is rapidly expanding," Edmunds said. "The equipment at Trentwood Works has been installed to meet the requirements for uniform quality and finishes necessary for this large market."

"From an approximate 40,000,000 pounds of the metal used for cans in 1960, we estimate that more than 100,000,000 pounds of aluminum will be utilized in 1961," he said.

Complexity and the high speed at which the can stock line operates, are impressive. The equipment is divided into three units to accomplish various processing steps, with one of the units stretching 140 yards in length. The over-all installation includes multi-story high accumulators, 28-foot high tanks which contain up to 3900 gallons of degreasing solutions, electronic controls and X-ray installations to insure consistent quality.

The processing line has been designed to finish aluminum which has been hot and cold rolled to can stock gauges from huge 7,000-pound ingots cast in the Trentwood mill. The line automatically cleans, inspects, flattens, coats, trims, shears and packages the aluminum in both coil and sheet form.

The complete equipment is composed of a degreasing and flattening line, a coating line, and a classifying line.

Ink Company Building at Davis Industrial Park

PORTLAND—The Great Western Printing Ink Co. is building a 12,000 sq. ft. warehouse in Davis Industrial Park, here, that will cost in excess of $100,000.

Affiliated with the Martin Driscoll Co. but operating independently, Great Western was founded in 1925. The move to Davis Park will be the firm's second move in the last 10 years.

In addition to the warehouses and production space, an additional 2,400 sq. ft. of second floor office and laboratory space is provided. Completion is scheduled for December.

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A. J. Gerrard Opens Two New Western Warehouses

SAN LEANDRO, CALIF. — The A. J. Gerrard Co., opened a new warehouse here September 1, an addition of 400% over previous facilities here. The company, makers of strapping, tools and accessories, also opened new facilities for warehousing and shipping in Seattle.

The San Leandro facility, located at 820 143rd Ave., includes a tool demonstration room plus facilities for damaged tool repair. The latest methods of material handling are incorporated into the warehouse to speed up receiving, storage and shipping operations.

Located at 970 Thomas St., the Seattle warehouse will be under the direction of *Richard Groark*. The new facility is served by the Great Northern and Northern Pacific railroads.

With the opening of the Seattle warehouse and the new San Leandro warehouse, plus present full facilities at Portland and Los Angeles, A. J. Gerrard & Co. is able to offer overnight delivery service to all points on the West Coast.

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Industrial Supply Firm Moving to Crocker Park

SAN FRANCISCO — A. J. Glesener Co., Inc., industrial supply firm, has announced plans for expansion of its San Francisco operations in new Crocker Industrial Park offices and warehouse.

Construction is underway on a 60,000 sq. ft. building which is scheduled for completion in December.

Glesener, in San Francisco for 50 years, is now located at 975 Bryant St. The business was acquired by Ducommun Metals and Supply Co. in 1958 and is now a wholly-owned subsidiary of Ducommun which has its general offices and plant in Los Angeles.

Miles F. Alexander, general manager of the San Francisco operations, said his firm's expansion forced the move to Crocker Industrial Park in order to provide better service in modern facilities.

Aerojet Buys Interest in Global-Marine Firm

LOS ANGELES—Global Marine Exploration Co., a Union Oil Co. of California subsidiary with headquarters in Los Angeles, has agreed to sell 400,000 shares of its treasury stock to Aerojet-General Corp., it was announced recently by *Robert F. Bauer*, Global's president.

As a result of this sale Aerojet-General and Union Oil will each have a 45% interest, with the remaining 10% held by key Global personnel.

Global Marine was organized to drill oil exploration core holes in the offshore area of California. After developing new exploratory and underwater drilling techniques, Global broadened into several other activities, including searching for various mineral deposits, salvage work, underwater storage of liquids and solids, and general underwater construction work.

According to Bauer, Global Marine's operations will be divided into two units, one of which will be substantially in support of oil exploration which it has carried on in the past; the other will be devoted to general efforts in the field of oceanic exploration. In this area Global Marine will work closely with the recently organized Oceanic Division of Aerojet-General, an outgrowth of Aerojet's former Underwater and Anti-Submarine Warfare Divisions.

Window Glass Plant Planned for Tacoma

TACOMA, WASH. — *J. M. Cline*, Bremerton, Wash., president of International Glass Industries Ltd. of Vancouver, B. C., has announced plans for construction of a $1,500,000 plant here for the manufacture of window glass.

Negotiations are currently underway for a Port of Tacoma plant site.

The plant, which will be the first of its kind in the Pacific Northwest, will require about 10,000 sq. ft. of floor area and will employ about 40, Cline said. The initial product will be window glass and later the firm may make other products.

Cline said Tacoma was chosen as a plant site because of the availability of all necessary chemicals, central location in the marketing area and favorable electric rates.

Constructors Equipment Named Denver P&H Dealer

DENVER — Constructors Equipment Co., Inc. here, has been appointed dealer for P&H construction and mining equipment manufactured by Harnischfeger Corp. of Milwaukee.

Jack F. Catalane, general manager for Harnischfeger's construction and mining division, said the new dealership will cover the entire State of Colorado. Catalane will be assisted by *D. P. Shanahan*, Harnischfeger's construction and mining division Denver district manager.

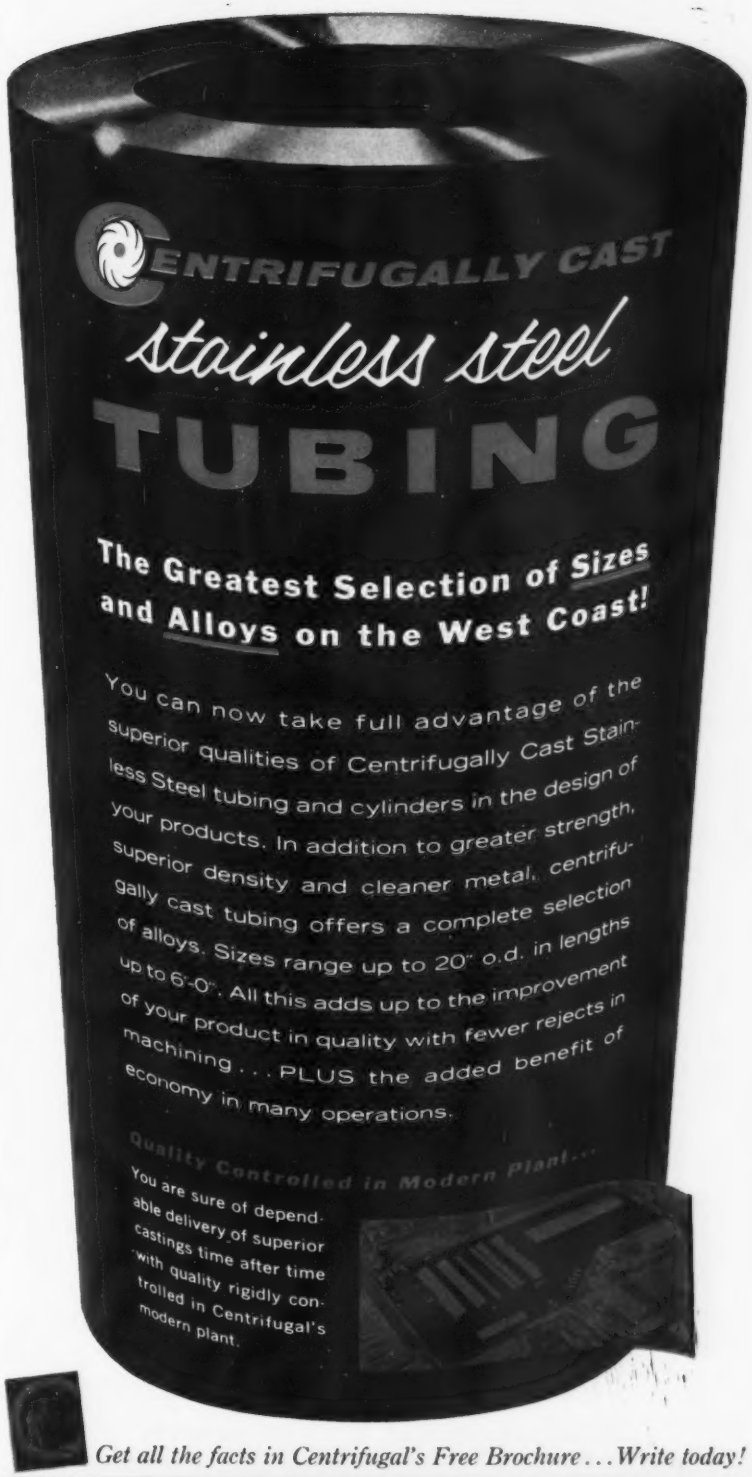
The Constructors Equipment firm, under President *D. G. Gibson* will handle the complete line of P&H crawler and rubber-tired power cranes and shovels from the 12½-ton Model 105B-TC "Miti-Mite" through the 110-ton capacity Model 1015, plus soil stabilizers.

Other personnel at the new dealership, with facilities at 1136 Walnut St., here, includes *R. L. Cutler*, service manager, and *J. Keith Moser*, parts manager.

Kuhl Manufacturing Adds To San Leandro Facility

SAN LEANDRO, CALIF.—*Jay W. Kuhl*, owner of the Kuhl Manufacturing Co., has announced a 12,500 sq. ft. addition to the company's plant at 2424 Davis St., here.

Estimated investment is $65,000. The expansion is for production and warehousing. Two units will be available for lease.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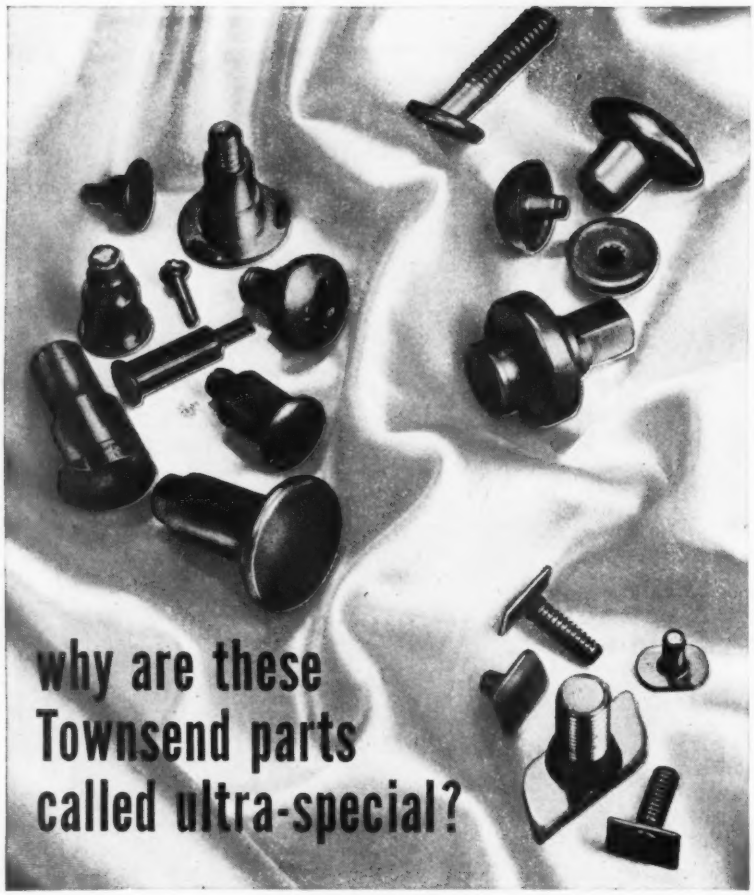

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Moore Mfg. Purchases Assets of Aetna Mfg.

SAN FRANCISCO — Moore Manufacturing Inc., here, producer of plastic and rubber products, has announced the cash purchase of the machinery, inventories and other principal assets of the Aetna Manufacturing Co. Inc.

According to *J. Max Moore,* president, Aetna becomes the Amco Division of Moore, with headquarters at Potrero Ave. and 18th St., San Francisco, and a modern factory at 1221-1271 Whitethorne Way, Burlingame, California.

E. D. Brown has been appointed general manager, and *Luther Landon* will be plant superintendent of the new Amco Division.

The new division, with an annual capacity of over 3,000,000 pounds, will manufacture vinyl cove base and vinyl carpet base for the flooring, tile and building industries. Heavy basic plastic manufacturing equipment includes a 4½-inch electronic extruder, 60-inch mills, and complete poly vinyl chloride mixing and compounding facilities.

Hughes to Add 500 More Engineers, Scientists

CULVER CITY, CALIF. — Hughes Aircraft Co. will hire more than 500 scientists and engineers during the next six months at its aerospace laboratories here, *Roy E. Wendahl,* vice president, announced last month.

"The need for the additional specialists is due to expanding research and development work on space and national defense projects such as moon exploration, ballistic missile defense, space vehicle guidance, Air Force interceptor improvement, guided missiles, anti-submarine warfare and others," Wendahl said.

"The company is engaged in a search to obtain men and women of extensive experience who are outstanding in their fields," the Hughes official said. "In addition to these specialists the company will hire several hundred electronic designers, draftsmen, and precision machinists."

The new personnel will raise the number of scientists and engineers at the Culver City facilities to about 2,600. Total employment in Culver City is expected to reach more than 7,500. Overall company employment currently stands at approximately 28,000.

Taylor Fibre Co. Expands LaVerne, Calif. Facility

LAVERNE, CALIF. — An expansion and modernization program to meet the increasing demand for its laminated plastics has been completed at the plant of Taylor Fibre Co. here.

The additional floor space at the 50,000 sq. ft. plant is being used primarily for warehousing, enabling the rearrangement of other departments for a more efficient flow of materials.

The new warehousing area has released the entire production floor for installation of laminated plastic manufacturing and fabricating facilities. A new truck loading dock facilitates materials handling.

The LaVerne expansion is part of a company-wide building and modernization move. Taylor's main plant is at Betzwood, Pa., near Philadelphia.

American Steel Warehouse Building Portland Edifice

PORTLAND — Construction of a new $200,000 American Steel Warehouse Co. office building is underway at 4033 NW Yeon Ave., according to *Howard Hedinger,* vice president.

The new building, to comprise 12,000 sq. ft. of office space, is located next to a 128,000 sq. ft. warehouse which will be utilized for steel storage.

Upon moving to the new location, the firm plans to expand its present lines of steel and mill supplies and install over $100,000 worth of the latest steel handling equipment.

The warehouse will become the central branch and depot for the company's three branches, American Steel & Supply of Eugene and Medford, Ore., and Coast Steel & Supply of Redding, Calif. Stocks slated for the new location will be worth in excess of $1,000,000, Hedinger said.

$5,000,000 Asbestos Mill Underway at Copperopolis

STOCKTON, CALIF. — The Jefferson Lake Sulphur Co. has announced construction has started on a $5,000,000 asbestos mill in Copperopolis, Calaveras County.

When completed, the mill and site will represent an investment of more than $10,000,000. The plant will employ from 100 to 175 persons when it begins operations which are scheduled for March, 1962.

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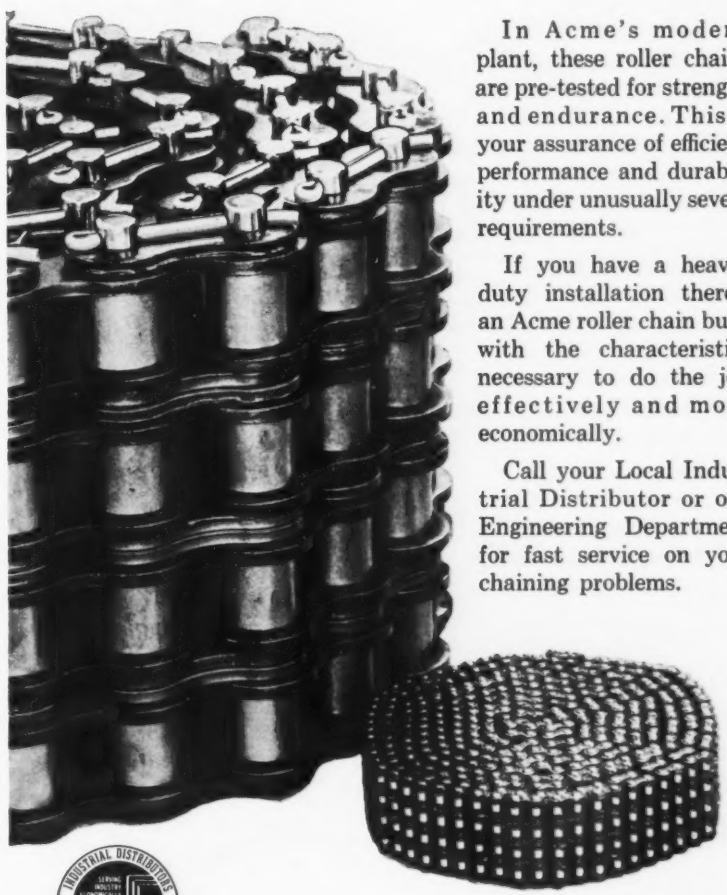

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Make Tungsten-Alloy Strip From Centrifugal Castings

ALBANY, ORE. — Oregon Metallurgical Corp. has recently begun experimental production of tungsten-alloy strip from centifugally cast material, president *Stephen M. Shelton* has announced.

Shelton stated that the material is directly rollable to sheet or strip and that no prior forging breakdown or extrusion is necessary. Also, this material is rollable at much lower temperatures than would be expected. For example, a 98% tungsten-2% molybdenum alloy was rolled at 1000°C (1832°F) from as-cast thickness of 0.64 inch to a finish thickness of 0.035 inch without the benefit of an intermediate anneal or recrystallization.

It is believed that the ability to direct roll at this temperature without prior breakdown is due to the fine grain size of the cast material as compared to more conventional arc-cast ingots. With arc-cast ingots, the chilling effect of the mold is opposed by the heat of the arc. The resulting directional heat flow tends to produce columnar grains. In centrifugal castings, the rapid solidification against a graphite mold results in equiaxed grains of approximately one-fifth of the size of the grains in arc-cast ingot.

The process utilizes vacuum consumable-electrode cold-crucible skull-melting followed by vacuum pouring into a graphite mold spinning about a vertical axis. For brevity Oremet calls this process HPC (High Pressure Cast), referring to the pressure due to the centrifugal force exerted on the solidifying metal.

Pabco Div. Handling Mastipave Products

SAN FRANCISCO—When Pabco (Fibreboard Paper Products Corp.) recently discontinued its floor covering business, the marketing of Mastipave, a commercial flooring, was transferred to the new Pabco Industrial Products Div.

"The only major change concerning Mastipave," *B. E. Bryans*, general manager, Industrial Products Div., stressed, "has been in our sales organization."

Other commercial Mastipave products include a liquid safety floor covering; saturated lining felt; and adhesive materials.

Mine and Smelter Opens Branch in California

DENVER — Mine and Smelter Supply Co., here, has opened a new branch office in San Jose, Calif., to serve the Pacific Coast area. *D. J. Drinkwater*, manager of the company's Manufacturing Division, announced the appointment of *Roy C. Engstrom* as head of the new office.

The company manufactures Marcy grinding mills, Akins classifiers, pinch valves and other equipment used in the mining, chemical and stone products industries.

Elwell-Parker Appoints Colorado Representative

DENVER — King & East Machinery Corp., 2050 Bryant St., here, has been appointed representative for Colorado and eastern Wyoming by the Elwell-Parker Electric Co., Cleveland manufacturer of electric-industrial trucks.

Specialists in the distribution of industrial and specialized contractors equipment, King & East Machinery Corp. has had four expansions in the past 12 years. President and general manager is *R. J. King; J. M. East* is vice president and sales manager.

Type Bars Eliminated in New IBM Typewriter

SAN FRANCISCO — Shown in close-up is the single typing element of the new IBM "Selectric" typewriter announced recently by IBM's Electric Typewriter Division.

Instead of the type bars used in conventional typewriters, all the alphabetic characters, numerals and punctuation symbols are contained on the sphere-shaped element which moves across the paper on a carrier.

The sphere rotates and tilts at extremely high speeds as it selects and types the desired character or symbol. The left to right motion of the element eliminates the need for a movable carriage.

A newly developed ribbon cartridge mounted behind the typing element permits the typist to change ribbons faster and easier than was previously possible.

The new Selectric was developed by IBM engineers at the company's facilities in Lexington, Kentucky.

Sutorbilt Names Pacific Pneumatic Southland Rep

COMPTON, CALIF. — Pacific Pneumatics has been appointed Southern California representative for Sutorbilt Corp. to cover Southern California up through the counties of San Luis Obispo, Fresno, Madera and Inyo.

Located at 14418 Costa Mesa Drive, La Mirada, Calif. Pacific Pneumatic specializes in engineered components for pneumatic systems. The firm also handles compressors for Fuller Co., Catasauqua, Pa., of which Sutorbilt is a subsidiary, and Lehigh Fan and Blower Div. of Fuller.

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Plan 52-Acre Garden Type Industrial Area

MESA, ARIZ. — Plans have been announced for a 52-acre garden-type industrial development and an adjacent mobile home-apartment-golf course on 500 acres, with an investment ultimately to reach more than $30,000,000.

The development is to be made by *Clinton* and *James Ray, Virgil Crismon,* all of Mesa, and *Harold C. Olson* of Phoenix. The industrial park development site is located on the north side of McKellips Road between Higley and Recker Roads. The mobile home - apartment - golf course development will be immediately north of the industrial site.

The first unit of the garden industrial development is to be started this month, according to Olson.

Olson said that although the development will begin in a limited fashion, some 4,000 persons may be employed within the next 10 years in the area in plants located on three to five acres each. Olson said he expects to build his own electronics component plant here in the near future.

Clinton Ray said his development, Skyway Mobile Homes Estates, will have 1,400 mobile home sites and 656 apartments clustered around the 18-hole golf course. Adequate water is available, Ray said, as well as other utilities. The project will have its own sewage disposal plant.

Olson was founder and president of Phoenix Engineering and Manufacturing Co. in Phoenix which he sold in December, 1959 to Telecomputing Corp. of Los Angeles. At the time of the sale PHEMCO's sales volume totaled $1,000,000 annually.

Anchorage Firm Installs Block Making Machine

ANCHORAGE — A new electronically controlled block making machine has been installed at Anchorage Sand and Gravel Co., here, capable of producing 900 blocks an hour and representing an investment of $275,000, according to *A. H. Waldron,* plant owner and veteran Alaska manufacturer.

The machine can produce blocks in 90 to 100 different shapes, eight-inch or four-inch high. Large kilns dry the blocks overnight at temperatures of approximately 130 degrees.

After the blocks are removed from the kilns, they are placed in the company lot for 28 days before they are considered at their full strength. The blocks are class "A", meeting the 1,000 pound block test, the standards set forth by the American Society of Testing Materials, Waldron said.

Chain Firm to Transfer Operations to Portland

PORTLAND — Assembly operations for special industrial cameras and for canning machines will be moved here from the Bellingham, Wash. plant of Bellingham Chain & Forge, according to an announcement by Portland Chain Mfg. Co., 4000 NW Yeon Ave., here.

The move is a result of the closure of the Bellingham plant of Bellingham Chain & Forge and consolidation of its operations with those of Portland Chain. The new operation is a division of Portland Chain and will move into 5,000 sq. ft. of office and shop space at 1625 NW Hoyt St.

The separate location is necessary because of exceptional requirements for the control of dust and vibration, particularly in the camera assembly, according to company officials.

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Fluorocarbon Purchases Global Packing Company

ANAHEIM, CALIF. — Purchase of Global Packing Co., Palo Alto, Calif., for an undisclosed amount of cash, was announced by the Fluorocarbon Co., here, processors and fabricators of Teflon and Kel-F products.

This marks the second major expansion for Fluorocarbon this year, according to *George Angle,* Fluorocarbon president. In March the company established Fluorocarbon, Arizona Inc. in Phoenix.

Global Packing will operate as a wholly owned subsidiary with *V. A. Indig* remaining as manager.

Formerly a distributor and representative for Fluorocarbon Co., Global Packing will become a custom fabricator of Teflon and Kel-F products while also continuing as a sales and distribution organization.

Angle said manufacturing operations will begin in September. Global will continue to distribute a line of rubber and asbestos packing materials.

Pima Textile to Build $1,300,000 Cotton Mill

PHOENIX—Pima Textile Industries of Phoenix has announced plans for construction of a $1,300,000 cotton mill, to be Arizona's first.

Lon Stickrod, president of Pima Textile, said the plant will be built 32 miles northwest of Phoenix on U. S. Hwy. 60-70-89 along the Santa Fe line. The company has acquired 20 acres with an option to purchase another 90 acres.

Designs call for a 40,000 sq. ft., one-story structure, equipped to process cotton into rolls and sections of quilted material for the manufacture of items such as skirts and bedding. Between 200 and 300 persons will be employed, Stickrod said.

Kaiser Aluminum Appoints Rep for Salt Lake Area

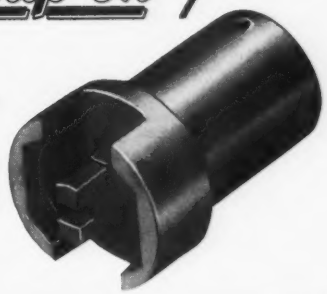
SALT LAKE CITY—Metals Supply Co., Inc. has been appointed a distributor of Kaiser Aluminum sheet, plate, rod, bar and extrusions in the Salt Lake City and intermountain areas including the surrounding states of Idaho, Wyoming, and eastern Nevada.

The company, with headquarters at 121-135 Social Hall Ave., here, was formed in 1941 by *Rudolph Orlob,* who also heads its affiliates, Industrial Supply Co., Inc., and Mountain States Rubber Co., Inc.

Another Tool Answer

by Snap-on

New Bung Starter Socket



Got a tough tool problem? Try SNAP-ON for the solution. Take this new SNAP-ON bung starter socket, for example. It fits practically any bung you'll find — on grease and oil drums; containers for chemicals, solvents, etc. It eliminates wasted time, damage to bungs and drums, and the skinned knuckles you get with makeshift tools. This socket will pay for itself over and over.

Fits every bung we've tried

The above photo is typical. Bungs come in a wide variety of sizes and types with many different styles and shapes of turning flanges. This socket handles every one we've checked.

Use this bung starter socket with any ½-inch drive wrench handle or impact wrench. Order a supply from your SNAP-ON representative. He will be happy to serve you for any of your tool requirements — work with you on tool-use problems, or place at your disposal SNAP-ON's creative engineering service. He's a hand tool specialist with wide experience. Call your nearest SNAP-ON branch or write us.

Here a worker removes a bung quickly, easily. Socket fits around the outside circumference of small bungs, the inside circumference of large bungs, enabling the specially shaped housing or spring-loaded tongue to engage the various bungs.

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Foundry Adds New Casting Methods

Operator manufacturing shell cores at Superior Alloys Co , South San Francisco. In background is pile of previously prepared items. These will be used on automatic shell molding machine to cast parts in quantities.

SOUTH SAN FRANCISCO — Superior Alloys, Co., 150 Harbor Way, has added two new methods of stainless steel to its present system of using sand molds. The firm has installed a fully automatic shell molding machine and shell core equipment. Shell molding is a casting method permitting high quality and rapid production. It is an excellent means of casting in quantity and often provides reduced per unit costs.

In addition the Company has been developing a method of ceramic molding, which is in a limited production experimental stage. Ceramic molding is an extremely high precision casting method, similar to the lost wax method, although considered to be faster and not limited in size. Here, refractory materials are poured over the model in slurry form and solidify. They are then baked at a high temperature and the mold in final form resembles unglazed porcelain. Key to the process' accuracy is the fact that virtually no shrinkage is incurred during baking.

The shell molding and ceramic molding processes when added to Superior's present method of sand casting, provide a service covering the whole field of casting stainless steel.

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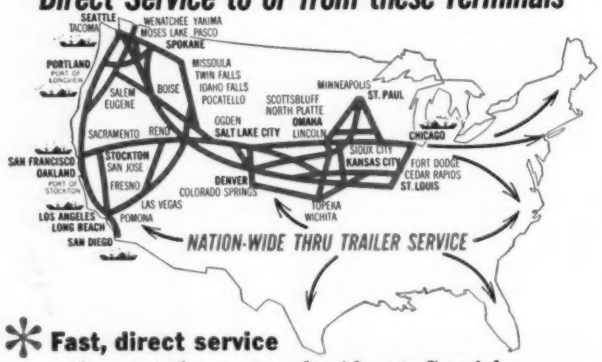

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Granville-Phillips Co. Relocating at Boulder

BOULDER, COLO. — The Granville-Phillips Co., manufacturers of ultra-high vacuum equipment, has purchased a factory site on Arapahoe Road here and will move here from Pullman, Wash., according to *Daniel Bills*, president.

Thirty-eight families associated with the firm's operation in Pullman, are expected to move to Boulder.

Product manufactured by the firm is used by Ball Brothers, Beach Aircraft and others. The company also has a large export business.

Michigan Chrome Acquires Allied Research Division

HOLLYWOOD, CALIF.—The Allied Research and Engineering Div. of Lytle Corp., here, has been purchased by the Michigan Chrome and Chemical Co. of Detroit.

The acquired organization, which will now be known as Allied Research and Engineering Co., was originally established about 10 years ago as a custom electroforming division of Allied Record Manufacturing Co.

Paul D. Harper has been appointed general manager of the Hollywood company which is located at 6916 Santa Monica Blvd.

Mipro Metal Products Completes Expansion

SOUTH SAN FRANCISCO—Mipro Metal Products Co. has recently completed a 50 percent floor space expansion at its plant here bringing total area to 37,500 sq. ft. according to *Herbert Baum*, president.

. . . for more details adv. opp. pg., circle No. 71 on Reader Service Postcard ⟶

Photo courtesy Jones & Laughlin Steel Corp., Pittsburgh

FOR EVERY APPLICATION, THERE'S ONE CRANE OUTSTANDING . . . P&H!

This wide-span P&H overhead crane is equipped with a trolley-mounted cab so the *operator stays right above the load at all times.* He can clearly see to move and load coils of steel or stacks of plate with unquestioned safety and accuracy. In addition, the P&H Hook-a-Weigh electronic crane scale, in combination with a motorized hook, enables the crane operator to both weigh loads and rotate them safely and precisely. This means faster shipping and easier spotting.

Here, as in every P&H crane installation, Harnischfeger engineers have carefully considered all the factors that affect performance. P&H cranes are built from standard components —yet are individually engineered for the job. Your particular material-handling requirements are integrated right into the overall design. Result: Costs are kept low—but performance is unbeatable.

Whether you need 3-ton or 300-ton capacity, it will pay you to find out more about P&H job-engineered overhead cranes . . . and what they can mean to your plant operation. Get a helpful recommendation on your next crane inquiry — send it to Harnischfeger!

P&H Hook-a-Weigh transforms the crane hook into a sensitive, accurate electronic scale. It easily combines weighing and handling operations — eliminates floor-mounted scale equipment. It also maintains an accurate, permanent record on tape or card. Can be used on any crane — capacities up to 200,000 lbs. Another useful feature, the motorized hook, can be combined with Hook-a-Weigh or offered separately, to enable the crane operator to rotate the load at the push of a button, eliminating in many cases, the need for floor help.

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P&H Hevi-Lifts shrug off such punishment because their standard construction is totally enclosed — to permit work under all possible atmospheric conditions. There are no "special" modifications needed as with other hoists.

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Graver Tank Awards Joint Contract

LOS ANGELES — Graver Tank & Mfg. Co. Div. of Union Tank Car Co. has awarded Idaho Maryland Industries Corp., an $8,500,000 contract that will be fulfilled as joint venture by the two subs.

The contract includes construction of tanks, cableways, floor panels, closure doors and other steel structures for the Titan II missile silos at Davis-Monthan AFB, Tucson, Arizona and Vandenberg AFB, California.

IMI's Iteeco, Sierra-Schroeder Controls and Denver Steel & Iron Works Divisions, located in California and Colorado, are currently working on similar Minutemen silo installations in Montana while Ward's Portland Industries Div. has been a supplier of parts for the Thor, Minuteman and Titan missiles.

Headquarters for the joint venture have been established at the IMI corporate offices in Studio City, Calif. with on-site offices currently under construction at Tucson.

Alloy Steel Bars Added to Pacific Tube Production

LOS ANGELES — Pacific Tube Co., here, has announced that it has further expanded its cold drawn bar production to include the manufacture of alloy steels.

Initial stocks of alloy have been successfully processed and field tested in the A-4140 analysis. Annealed and heat treated bars have been produced in both the cold drawn as well as the turned conditions.

The company states that both leaded and non-leaded stock of this commercial grade is now available, and others will be added as the market expands.

Power Sources, Inc. Names J. T. Hill Co. Distributor

SAN GABRIEL, CALIF. — *Warren Huth*, president of J. T. Hill Co., here, has announced their appointment as representatives of Power Sources, Inc. of Burlington, Mass. in the states of California, Arizona, Nevada, and Hawaii.

Power Sources, Inc. is devoted to the design, development and manufacturing of solid state power supplies and power conversion devices. J. T. Hill Co. maintains headquarters at 420 South Pine St., here, with branches in San Carlos and San Diego, Calif.

Robbins & Meyers Opens L. A. Moyno Pump Sales Office

Standing next to Moyno progressive cavity pump in Los Angeles warehouse and service facility is James L. Badgley, Los Angeles sales manager. Being offered are new and improved pump designs, genuine pump parts, application and service consultation. Moyno facility is located at 7755 Paramount Pl., Pico Rivera, Calif.

Light Industry Park Planned for Tempe

TEMPE, ARIZ.—Industrial Park Corp., developers of industrial areas in Southern California, has announced plans for a $10,000,000 145-acre industrial park in Tempe.

To be known as Palo Verde Industrial Park, it will be located at the southeast corner of Broadway and 56th St. Construction of a 40,000 sq. ft. plant will begin this month, according to *F. M. McCown*, Industrial Park's president.

McCown said the development, wholly within the city limits of Tempe adjacent to the Southern Pacific Railroad line and the planned Phoenix-Tucson freeway, will provide sites for garden-type light industry.

The development can handle up to 90 light industries depending on the size of the individual plants and in keeping with an attractive, park-like atmosphere, McCown said. He said his company will construct plants for sale or lease to an industry, or will provide the site and the industry can construct its own building.

McCown said a major innovation in the Palo Verde Industrial Park will be provisions for housing small individual units for engineers, consultants, medical facilities, restaurants and other facilities.

Arcadia Metal Products, Acme Metal Molding Merge

LOS ANGELES — As part of the mechanics of a merger, Arcadia Metal Products has moved 120 employees, 200 tons of aluminum stock, all manufacturing and office equipment from their former Fullerton, Calif. location to Acme Metal Molding Co., 5022 Triggs St., Los Angeles.

Additional space to house the merged firms was provided in the form of an expanded production area from 60,000 to 100,000 sq. ft. Acme redesigned production lines to integrate the Acme and Arcadia activities.

No new corporate name has been announced yet by the parent company, Northrop Corp. Arcadia manufactures sliding glass doors and windows, window-wall systems and the Brise Soleil architectural sunscreen system. Acme produces aluminum storefront components, commercial doors and entrances.

Local Purchasing Agents Report Continued Upswing

LOS ANGELES — According to the current Purchasing Agents Assn. of Los Angeles business survey, production, new orders and employment is continuing a late summer upswing.

No positive trend has yet developed for prices but the forecast for new orders is the most optimistic in three months. According to respondents, 34% felt that production this month would be higher, that new orders would be on the increase for 43%, employment up for 21%, inventories up for 23%.

National indexes for the four areas in the same order are 11%, 10.5%, 7.5% and —6%.

Plastic Age Co. Acquires Extruded Shapes Patents

SAUGUS, CALIF. — Plastic Age Co. here, has acquired from Glastrusions, Inc., equipment and United States and foreign patents for a process of continuously extruding reinforced plastic structural shapes.

This will enable Plastic Age to add to its present line of "Glasrin" compression molded structural shapes an almost endless variety of extruded shapes at a much lower manufacturing cost.

The company is located at 14300 Davenport Rd., Mint Canyon, here.

Nucleonics Lab Moves to Hughes Fullerton Plant

FULLERTON, CALIF. — Hughes Aircraft Co.'s nucleonics laboratory and 50-man staff have been transferred from the company's Culver City plant to its ground systems group here, *C. Harper Brubaker,* vice president and group executive, announced recently.

Dr. John W. Clark will continue as manager of the nucleonics laboratory, which formerly was called the nuclear electronics laboratory. He will report to *Dr. Nicholas A. Begovich,* vice president and assistant group executive.

"The laboratory's major effort will be concentrated on component and system research and development to fully utilize electronics in the nuclear age," Brubaker said.

Products developed by the laboratory include compact cyclotrons, linacs and remote handling equipment which have military, commercial and industrial applications.

U. S. Rubber Builds Glass Rocket Motor Inclosures

LOS ANGELES — U. S. Rubber Co. reports that it has started pilot production of insulated glass cases for the first stage rocket motor of the Polaris missile.

The motor cases were designed under contract from Aerojet General Corp. and were test fired at Aerojet's Sacramento, Calif. facility. Cases are filament-wound fiberglass more than 14-ft. long and 4½-ft. OD. and are the largest glass cases to be loaded with propellant and fired successfully.

This development is expected to reduce weight of the inert parts of rocket motors. The cases are protected from extreme temperatures of burning propellant by a rubber-type insulation on their interior.

Los Angeles Plating Gets Lockheed Process License

LOS ANGELES — Licensed by Lockheed Aircraft Co. to apply a low embrittlement cadmium coating to high tensile strength steel is Los Angeles Plating Co.

The process eliminates the need for baking to relieve embrittlement after plating operations. Application conforms with Lockheed specification L.A.C. #491. The firm is located at 6921 Avalon Blvd.

General Motors Begins Recalling Auto Workers

SOUTH GATE, CALIF. — General Motors is starting recall of maintenance and production workers to its Buick, Oldsmobile, Pontiac assembly plant and to its Fisher Body plant in Van Nuys, Calif. in preparation for 1962 model output.

All plants will be in full operation next week. Ford Motor's Pico River plant began recalling about the same time and Chrysler resumed operations on Aug. 21.

Rex Precision Products Adds New Plant Building

CULVER CITY, CALIF. — The investment casting firm of Rex Precision Products Inc. announces the addition of a new plant to provide plaster molding for non-ferrous casting.

Heading up the new plaster casting operation is *Glen Campbell* who will operate the new Rex plant at 11825 Major St. The facility will specialize in production of larger aluminum castings with fine finish and good physical properties.

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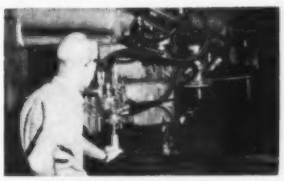

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Solid State Radiations Moves to New Facility

LOS ANGELES — Solid State Radiations, Inc. has moved into a new 9,000 sq. ft. facility in West Los Angeles, doubling the space utilized by the firm at their previous location.

Housed in the building are semiconductor research labs and production department, physics department, and electronics research and production. A shop for tooling and building of prototypes as well as administrative offices are also located at the new site.

Dr. Stephen S. Friedland, president, said the firm has increased its staff from six to 35 during its first year of operation. The company is engaged in research and manufacturing of nuclear particle detectors and other semiconductor devices, and associated electronic systems.

Monsanto Chemical Opens New Plasticizer Plant

LONG BEACH, CALIF. — A new plasticizer manufacturing unit has been opened by Monsanto Chemical Co. at their Long Beach facility that is the first of its type on the West Coast.

It is capable of producing about 15 million pounds of phthalate esters, and plasticizers that give flexibility to resins contained in a wide range of plastic products.

According to *Armen Klemm,* Los Angeles sales manager, Monsanto organic chemicals division, in the past five years the volume of vinyl plastic processing in the Southland has tripled and has grown at a rate four times the national average. Klemm said that the firm has upped bulk storage and blending capacity for phthalate esters by 50% locally. *Johan Janesen* is manager of the plant which also produces phosphoric acid and phosphate salts.

Burke Engineering Handles United Electric Controls

LOS ANGELES — Named a stocking distributor in California and Arizona for United Electric Controls is Burke Engineering, 1824 S. Burlington Ave.

United Electric Controls will have Burke outlet their temperature, pressure and vacuum controls used in environmental chambers, ovens, incubators and other applications where close control of air, gas or liquid conditions is vital.

Hydropoise, Inc. New Manufacturing Plant

SCOTTSDALE, ARIZ.—Hydropoise, Inc., a new company that will manufacture instruments to measure the flow of liquids and gases, has leased plant facilities at 230 S. Wells Fargo Road. The company is a subsidiary of the Brooks Instrument Co., Inc., of Hatfield, Pa.

Edward E. Francisco, Jr., president and general manager of Hydropoise, said his company will manufacture turbine-type flowmeters, mass flowmeters and associated digital transmission and computer equipment.

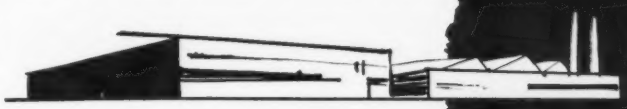
The plant occupies 5,000 sq. ft. of production annd office space and will have a payroll of from 20 to 30 persons during the first year of production, according to Francisco.

During the first period of operation, Hydropoise's production will go mostly to military applications, but eventually this will change to commercial items especially in the petrochemical field.

Francisco was president and founder of Francisco Engineering Co. of Calabasas, Calif., which was merged into the Brooks Instrument Co.

Ralph Kuttner heads research and development for Hydropoise.

Industrial COMPRESSED AIR SYSTEMS



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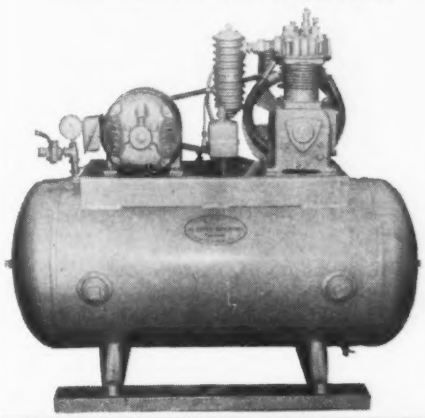

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Bunting Brass Opens New Facility at L. A.

Located at a new facility at 2614 S. Main St., Los Angeles, is Bunting Brass and Bronze. Branch office offers warehouse and machine shop service for brass and bronze bearings and bushings. Bunting distributors in Southland are Aircraft and Industrial Bearings, Culver City; Bearing Sales Co., Los Angeles.

Aerospace Unit Formed by B. F. Goodrich Co.

LOS ANGELES—Consolidation of various divisions' sales responsibilities to the federal government into a division called B. F. Goodrich Aerospace and Defense Products has been announced by The B. F. Goodrich Co.

J. W. Keener, B. F. Goodrich president, said the new division replaces B. F. Goodrich Aviation Products. It has been assigned company-wide responsibility for direct contract sales to the Defense Department and other federal agencies. *C. B. McKeown*, general manager of B. F. Goodrich Aviation Products, has been appointed general manager of the new Aerospace and Defense Products division.

The company's direct and indirect sales to the federal government last year amounted to $55,825,740, 7.3 percent of BFG's total net sales.

The name change, Keener said, is being made to reflect more clearly the division's activities in the general defense area and in the space and missile fields.

Syler Producing Line Of Grinding Wheels

GLENDALE, CALIF. — M. E. Syler announces that the firm of Syler & Sons has been formed for the production of grinding wheels in a plant located at 1344 E. Colorado St.

Syler indicated the firm will make aluminum oxide resinoid bonded abrasive items up to 10-in. OD and will also make silicon carbide products. Custom built bonded abrasive products are a company specialty.

Cadillac Plastic Opens Facility at Anaheim

ANAHEIM, CALIF. — Cadillac Plastic of California has opened a new branch office and warehouse at 1721 South Raymond Ave., here. It will be the firm's fourth office.

The new warehouse is being established to improve the firm's service in the Southern section of the Los Angeles industrial complex, said *Eugene Quinn*, president of Cadillac Plastic of Calif. Manager of the new branch is *James A. McBride*.

The new Anaheim warehouse will enable the firm to make over-night delivery on 90 percent of all orders received from the Mexican border north.

Cadillac Plastic is a division of Cadillac Plastic & Chemical Co., warehouse distributor of plastic sheets, rods, tubes and films. The parent firm has headquarters and a manufacturing plant in Detroit.

Alcock Co. Establishes Material Handling Firm

DOWNEY, CALIF. — *Frank P. Alcock*, formerly a partner of Ajay Co., Montebello, Calif. has announced resignation from the firm to establish a material handling organization bearing his name at 9434 E. Firestone Blvd.

To be known as F. P. Alcock Co., the firm will handle a varied line of material handling equipment and will serve as factory representatives in the Southland and Arizona. Alcock has spent 15 years in the material handling field both from the manufacturing and distribution end. In addition to sales and installation activities, Alcock Co. will offer a consultation service.

Standard-Humble Builds Gasoline Recovery Plant

GAVIOTA, CALIF.—Standard Western and Humble Oil & Refining Co. state they are building a gasoline recovery plant at Gaviota to serve gas producing properties jointly owned by them. The new plant is designed to handle 30 million cu. ft. of natural gas daily.

In addition to recovering gasolines from the gas, the plant will condition it for delivery to a Pacific Lighting Gas Supply pipeline now under construction from Goleta to Gaviota. The new facility is scheduled for October completion.

New Computing System For LA Army Ordnance

PASADENA, CALIF.—A computer installation unveiled recently by the Army's Los Angeles Ordnance District provides a nerve center for managing some $1.8 billion in outstanding contracts held by Southern California industries.

Operations managed by the Army computer system are responsible for supporting the economy of this area with almost $300 million in contracts annually.

According to *Col. P. H. Scordas,* Commanding Officer of the Los Angeles Ordnance District, headquartered at 55 South Grand Ave., Pasadena, this is the first time an electronic computer has been applied to the work of contract management.

At Col. Scordas' direction, the Los Angeles Ordnance District has installed an IBM RAMAC 305 computer to keep track of financial and performance factors of all Ordnance contracts with manufacturers in Southern California, Southern Nevada, Utah, Arizona, Texas and New Mexico. The vast majority of these contracts, Col. Scordas said, are fulfilled by Los Angeles area firms.

"We have more deadlines to meet than we can keep track of under normal procedures," Col. Scordas explained at the new computer center.

The Ordnance District Commander pointed out that his staff is responsible for the administration of 1200 to 1400 active contracts, covering some 16 Army missile systems. In fulfilling these contracts, manufacturers in this area must make some 5,000 separate shipments per month.

Administration is broken down among six separate branches of the Ordnance group. Formerly, each department kept its own records. There was no central record of performance or production status of these vital contracts.

Under the former manual system, if the Army needed a report on all of its contracts in this area, it took more than two weeks to compile it. Hundreds of people had to contribute to this work. Inevitable clerical errors developed.

Now, a complete report, current within 24 hours is compiled by pushing a few buttons on the Army computer. The computer prints the complete record in two hours.

To perform this job, the computer maintains a complete status file of all contract information in the District on a magnetic disk memory which provides space for up to 5,000,000 units of information. The computer works with this vast store of information in random order, giving the Ordnance people full flexibility in making inquiries or additions to the records.

The main purpose of the installation, Col. Scordas said, is as a tool in defense mobilization. It provides the control a Commanding Officer needs in guaranteeing the timely delivery of weapons to Army units.

The Ordnance District Commander pointed out that the computer will reduce operating costs in the District by an estimated $50,000 per year.

The new system is being studied for possible standardization of procedures in all the country's 11 Ordnance Districts.

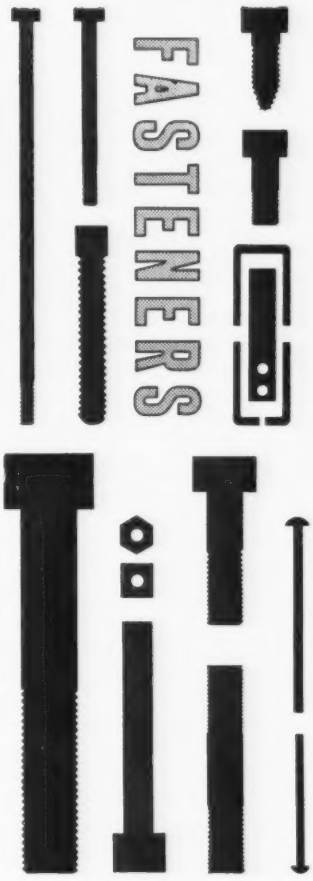
Allied Supply Named Rockwood Valve Distributor

Charles W. Smith, president of Allied Supply Co., South Gate, Calif. demonstrates features of Rockwood Ball Valves which Allied has added to its line of specialty items. Valve features a spherical ball with a cylindrical hole passing through the center and a synthetic rubber seat.

Electro-Mechanical Firm Doubles Its Facilities

LOS ANGELES — Dynel, Inc. specialist in the development and manufacture of pulse code telemetry and control systems, has doubled its facilities by moving into a new 18,000 sq. ft. building at 12923 South Spring St., here. This is one of the initial expansion moves planned by the parent company, Varec, Inc., according to *Ray V. Long,* president.

Concentrating on electro-mechanical control for the petroleum, chemical and petro-chemical fields, Dynel, Inc. is equipped to serve as a single source of supply for design, fabrication and installation of remote monitoring and control systems for tanks and pipelines.



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Epps Industries Adds McKay Tubing Mill

LOS ANGELES — Epps Industries has placed a second mill in operation that will produce welded steel tubing from 2.5-in. diameter down to ⅜-in., the smallest available on the West Coast to the general market.

The new mill, a McKay electric weld mill, complements an existing Yoder mill. The mill was installed in early summer (page 62-S, May 1961 issue.) and was necessitated by increased demand for welded steel tubing and the need to provide wider ranges of sizes in both round and square shapes.

The company maintains an inventory of 1.5 million ft.

G. B. Lewis Appoints New California Rep

HUNTINGTON PARK, CALIF.—*David M. Gatch,* president of Gatch Material Handling, 3370 East Florence Ave., San Diego, Calif., has been appointed Huntington Park and 3268 Rosecrans, as a representative of the G. B. Lewis Co. of Watertown, Wis.

Gatch will handle sales and distribution of Lewis materials handling containers in Southern California.

Acreage Option Acquired by CEC, Consolidated Systems

PASADENA, CALIF. — Acquisition of a joint option to buy 35 acres of industrial property in the Pomona Valley Colleges Research and Development Center was announced recently by Consolidated Electrodynamics Corp. and Consolidated Systems Corp.

The agreement was signed by *Robert H. Garretson,* president of Consolidated Electrodynamics; *Kennett W. Patrick,* president of Consolidated Systems; and *Alfred E. Gittelson* and *James F. Rigsby,* representing the industrial center.

Located among the Pomona Valley colleges, the site is bounded by the Santa Fe railway on the south.

CEC, a subsidiary of Bell & Howell Co., specializes in design and development of electronic instrumentation and high-vacuum and environmental test equipment.

Consolidated Systems, an associate company of Allis-Chalmers, Bell & Howell, and CEC, does contract engineering in the areas of analog and digital data processing and instrumentation and control systems.

Insurance Executive Probes Industrial Mental Health

LOS ANGELES — "Mental illness is costing industry $10 billion yearly, but there's a tendency to sweep the problem under the rug," according to *Charles J. Zimmerman,* president of Connecticul Mutual Life Insurance Co.

Backing his plea that industry should be concerned with mental health problems of each employee, despite his salary or job status, Zimmerman quoted the $10 billion figure during a Los Angeles press conference.

Charles J. Zimmerman

Zimmerman figures that 65% of all industrial dismissals are due to emotional inadequacy of the employee rather than poor job performance.

Believing that this problem can be solved by using industrially oriented psychologists and psychiatrists, Zimmerman suggests that firms too small to have their own staff personnel could pool resources and share mental health personnel.

He bases his suggestions on results obtained from his firm's psychiatric clinic, the first company-operated clinic in history, that is servicing 1000 Connecticut Mutual employees and at the same time is functioning as a pilot mental health program for industry.

Among problems handled by such organizations could be alcoholism, absenteeism, personality problems, counseling of accident prone individuals and screening for employment and promotion within the company.

Zimmerman states that about 25% of the top industrial firms in the country have some sort of psychological service for employees but that it may be 10 years before the idea is universally accepted.

Allied Chemical Plans Anhydride Facility

EL SEGUNDO, CALIF. — Allied Chemical will build a plant to make phthalic anyhydride on the site of present facilities near Los Angeles.

The General Chemical division of the firm will operate the plant that is scheduled for completion in late 1962. Announcement was made by *Kerby H. Fisk,* chairman of the board.

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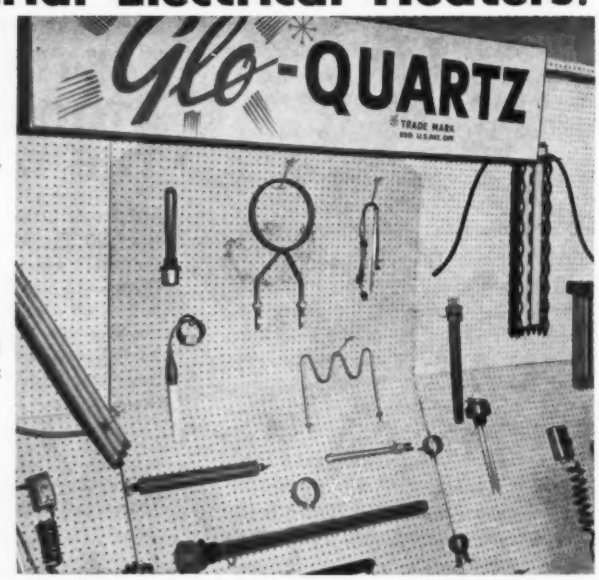

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Port Adds 27 Acres in Heavy Industrial Area

PORTLAND — The Port of Portland took legal title recently to an additional 27 acres in its River Gate Industrial District, the site it is developing for heavy industry at the confluence of the Willamette and Columbia rivers.

Port holdings in the area now total 630 acres on the Willamette side. The other large land-owner in the vicinity is the Leadbetter Estate, which has 2,000 acres immediately north of the Port lands at the peninsula's tip.

The Port and the Estate's trustees have recently been partners in a contour mapping and aerial photo-survey project of the overall area, with the best mutual development in mind. The Estate is held in trust for the benefit of Willamette University.

The new Port purchase, at a cost of $21,000, all but completes its drive to consolidate the land in area just south of the Leadbetter property.

Permanente Cement Building Island Distribution Plants

HONOLULU — Modern bulk cement distribution plants are being established in Hilo, Hawaii and Kahului, Maui by Permanente Cement Co., it was announced recently here by *Henry J. Kaiser.*

The twin plants will each have a storage capacity of 2,000 barrels of cement and will be the first such installations on the neighbor islands.

Kaiser said that the two facilities, representing a combined investment of more than $200,000, are expected to be in operation by December of this year.

Atlas Sheet Metal Planning Addition

PORTLAND—*Fred W. Drucker,* president Atlas Sheet Metal Co., here, has announced plans for a new addition to their rapidly expanding subsidiary, the Atlas Equipment Co.

The new addition, to cost $60,000, will cover an area of 7,000 sq. ft., increasing the firm's manufacturing and office space to 31,000 sq. ft.

Atlas Sheet Metal Co. has acquired the contract to manufacture ventilators for the USS Constitution, America's latest aircraft carrier which was severely gutted by fire December 19, 1960.

Clearing House Pays Off for Displaced Executives

OAKLAND, CALIF. — The California Department of Employment reports that its three chapters of Experience Unlimited as a source of supply for seasoned executive talent is proving effective.

The three chapters, located at Berkeley, Oakland and San Jose, are composed of top-flight executives, engineers and technicians who have been displaced because of a merger, consolidation or reorganization. Often, according to the California Department of Employment, these men have been associated with one company, many with an investment of 20 years or more with one firm, and are unacquainted with the special skills and techniques of job hunting.

The Department points out that before 1970, the number of workers under 25 will grow to 46 percent of the Nation's total work force; those 25 to 34 will increase only slightly, and account for 12 per cent, workers 35 to 44 will actually decrease by 1 per cent. Employees 45 years and older will account for 20 percent of the future work force.

This means, according to the Department, that in the late 1960's the Nation's work force mainly will consist of the young and unskilled, and the executives, craftsmen and technicians over 45 whose responsibility it will be to train them.

The Berkeley chapter, organized two years ago, now has more than 250 alumni, 73 of whom were placed directly into executive positions by the Department's service to employers. Experience Unlimited can be contacted through the Oakland, Berkeley and San Jose offices of the California Department of Employment.

Crane Supply Building New Salt Lake Branch

SALT LAKE CITY — Crane Supply Co., distributors of valves, plumbing fixtures, heat and air conditioning units and aircraft accessories, announced recently that it will relocate its branch in a new $275,000 building at 1155 S. 6th West, according to *W. J. Barsch,* local manager.

The 35,000 sq. ft. warehouse and office building is scheduled for completion in November.

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Contract News for the West

The U. S. Army Ordinance District, Los Angeles, with headquarters at 55 S. Grand Ave., Pasadena, announced August 10 the award of more than $12,100,000 in material contracts to industries throughout the Southland during the preceding six weeks.

The awards included the following:

Radioplane Div., Northrop Corp., Van Nuys, $933,900 for target missile equipment, $222,167 for target missile flight services, and $889,145 for repair parts.

Aerojet-General Corp., Downey, $872,394 for classified contracts, $594,911 for research and development, and $67,855 for Hawk missile warheads.

General Dynamics, Pomona, $978,580 for classified contracts and $136,639 for continued development of the Mauler missile system.

Harvey Aluminum, Inc., Torrance, four awards of $1,001,437 for cartridge cases, catapult assemblies and metal parts, and a $38,420 classified contract.

Fruehauf Trailer Co., Los Angeles, a $899,573 contract for trailers.

Bermite Powder Co., Saugus, a $748,556 classified contract.

Norris Thermador Corp., Los Angeles, $730,953 for cartridge cases.

Consolidated Western Steel, Los Angeles, $440,945 for Little John missile parts and $69,620 for research and development.

Gilfillan Brothers, Inc., Los Angeles, $483,529 for Sergeant and Corporal missile repair parts.

Eidal Mfg. Co., Albuquerque, N. M., $468,903 for trailer chassis.

Douglas Aircraft Co., Santa Monica, $345,519 for Nike missile system repair parts and $40,312 for research and development.

Nortronics Div., Northrop Corp., $190,460 for engineering services, $189,229 for Hawk missile repair parts, and $39,259 for research and development of rangefinder.

Packard Bell Computer Corp., Los Angeles, $315,850 for a high-speed analog-to-digital system.

Ford Motor Co., Newport Beach, a $288,980 classified contract.

Precision Sheet Metal, Inc., Los Angeles, a $254,665 classified contract.

Autonetics Div., North American Aviation, Downey, $150,000 for digital computer work.

Ryan Aeronautical Co., San Diego, $104,973 for target missile flight service.

Bendix Computer Div., Bendix Aviation Corp., Los Angeles, $89,259 for dimensional flight simulator.

Western Gear Corp., Lynwood, $57,148 for gear train assembly.

Firestone Tire & Rubber Co., Los Angeles, $55,192 for Corporal missile repair parts.

AiResearch Div., Garrett Corp., Los Angeles, $54,194 for tools and test equipment.

Constructors Transport Co., Montebello, $50,120 for services. *Task Corp.,* Anaheim, $48,540 for Nike Zeus missile test equipment. *Fred C. Henson Co.,* Pasadena, $46,311 for camera shutters. *Rocket Power/Talco,* Mesa, Ariz., $45,019 for basic research of light metal oxides.

Narmco Industries, Inc., San Diego, $43,794 for study of controlled erosion of rocket nozzles. *Lyne S. Trimble,* No. Hollywood, $41,630 for research and development of visibilized magnetic tape. *Hughes Aircraft Co.,* Culver City, $37,960 for a feasibility study. *Electronic Materials Corp.,* Santa Monica, $36,290 for general ablation studies.

Electro-Optical Systems, Pasadena, $33,787 for a development program to improve mirror replication processes, *W. C. Dillon & Co.,* Van Nuys, $33,779 for Nike missile repair parts. *Cubic Corp.,* San Diego, $29,995 to fabricate and install a trajectory measuring system. *Parabam, Inc., Hawthorne,* $28,194 for astrodome assembly; and *Computor Control Co.,* Los Angeles, $27,000 for a memory unit.

The San Francisco Ordnance District announced July 28 the award of $5,958,893 in national defense contracts to Western industry, mostly in Northern California.

The contracts include $2,903,681 awarded *FMC Corp.,* San Jose, for a variety of work including the production of 49 HAWK missile loader-transporters and 100 vehicle loading ramps; for engineering connected with the Pershing missile carrier; providing a pilot model carrier for a mobile field radar system; spare parts for the M-113 airborne personnel carrier, and other services adapting the M-113 as a mortar carrying vehicle.

Aerojet-General Corp., Sacramento, $1,340,288 for HAWK missile motor production equipment, spare parts, and product improvement research.

Pacific Car and Foundry Co., Renton, Wash., $427,932 for additional engineering on the lightweight, tracked M-116 cargo carrier; and to design an installation therein of the Davy Crockett battlefield weapon.

Stanford Research Institute, Menlo Park, $230,634 for research connected with several Army guided missile programs.

Hexcel Products, Inc., Berkeley, $181,420 for research in propellant systems.

Ampex Instrumentation Products Co., Palo Alto, $98,932 for recorder-reproducers.

Ordtech Corp., Walnut Creek, $93,647 for analysis and development of microjet projectiles.

Hewlett-Packard Co., Palo Alto, $87,328 for signal generators and electronic testing equipment.

Hallikainen Instruments, Berkeley, $63,895 for highly accurate thermometers for temperature control and calibration.

Garlynn Engineering Facility of Raytheon Co., San Francisco, $59,825 for precision optical instrument mounts.

Tektronix, Inc., Palo Alto, $59,106 for oscilloscopes.

Contract News ...

Ralph N. Brodie Co., San Leandro, $35,638 for gasoline meter assemblies. *Shockley Transistor*, Palo Alto, $34,898 for basic research on silicones. *Marchant Div., Smith-Corona Marchant Inc.*, Oakland, $30,627 for cartridge clip guides on the new M-14 rifle. *Camfield Chemical Co.*, Newark, $28,000 for sulfuric acid. *Laher Spring & Electric Car Corp.*, Oakland, $27,605 for automotive spring assemblies. *Varian Associates*, Palo Alto, $26,146 for microwave test equipment. *Beckman & Whitley, Inc.* San Carlos, $17,028 for missile destructors. *A. Lietz Co.*, San Francisco, $16,500 for telescope mounts, and *Continental Chemical Co.*, North Sacramento, $11,010 for sulfuric acid.

Other contracts reported to WESTERN MANUFACTURING during the past month include:

Aerojet-General Corp., Azusa, $6,300,000 for AEC-NASA nuclear rocket development. The work involved preliminary design of the NERVA engine, performance of work responsive to the needs of Los Alamos Scientific Laboratory and the conduct of reactor tests.

Rohr Aircraft Corp., Chula Vista, an order valued at about $8,000,000 from Lockheed Aircraft Corp. for 83 shipsets of project engine power packages and other components for the C-130E Hercules troop carrier.

Gemco, Inc., Los Angeles, four Air Force prime contracts for $3,665,000 of which $2,424,000 is a follow-on for plylon and bomb rack assemblies for the Republic F-105 Thunderchief jet fighter, $278,000 for spare parts for general purpose bomb racks, and $205,000 for spare parts for bomb rack and gun assemblies for the F-105.

Royal Industries, Inc., Los Angeles, new orders totaling $3,500,000 composed mostly of classified military contracts.

Telecomputing Corp., Los Angeles, $800,000 from Bell Helicopter Co. for Army's multi-purpose HU-1B Iroquois helicopter; more than $600,000 from McDonnell Aircraft Corp. for fixed and movable aircraft control surfaces; and, $500,000 from Lockheed Aircraft Corp.

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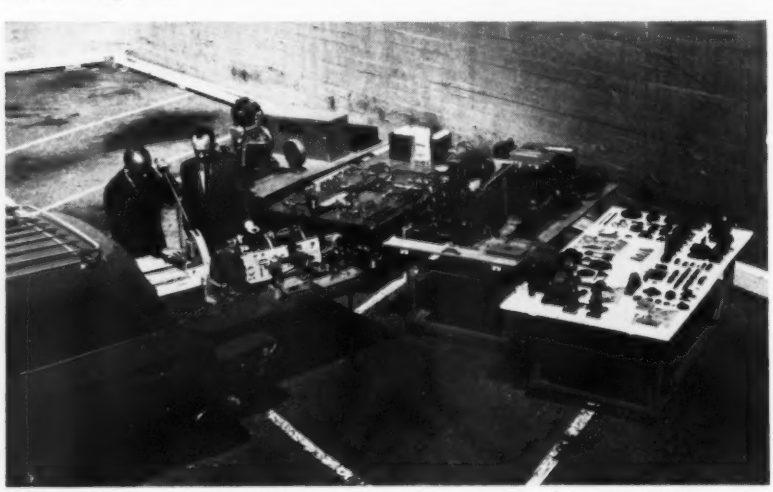
Garrett Supply Uses Mobile Product Displays

Harry Conrey, Garrett Supply, gets set to show power transmission layout to Ab. Allen, Boston Gear district manager, right rear, as Bob Dick makes an adjustment on Schrader display board in foreground.



George McClaskey, left, Marwedel power transmission specialist, shows demonstration unit from Di-Arco to Gene Best, Marwedel sales manager. Other boards interchangeable in wagon hold, from left, Sunnen, Schrader, Dumore and Boston Gear products.

LOS ANGELES — A wide range of industrial products are being demonstrated on-the-spot to customers in Southland areas who are unable to get to the showroom by clever mobile displays mounted in Garrett Supply Co. station wagons.

Basically a slab of plywood with the product line fixtured to it, demonstration boards slide into the body of the station wagon on casters fitted on the tail gate and inside the vehicle. Used locally and also by Marwedel in the San Francisco Bay Area, boards hold power transmission equipment by Boston Gear, Schrader Air Control items, Di-Arco metalworking equipment, Sunnen honing apparatus and Dumore automatic tap and drill units.

Omark Office Building Underway at Milwaukie

MILWAUKIE, ORE.—Construction has begun on a new 5,000 sq. ft. office building for Omark Industries, Inc., across the stream from the company's present saw chain factory.

The $85,000, air-conditioned building will house Omark's corporate headquarters, its product planning and market research offices, according to *John D. Gray*, president.

Omark has plants in Canada, Sweden and Australia.

Alvey Conveyor Appoints Rep for No. California

SAN FRANCISCO — The Alvey Conveyor Mfg. Co. of St. Louis has announced the appointment of Chaitin Equipment Co., 163 Main St., here, as its representative.

Chaitin Equipment Co., headed by *Neil Chaitin*, will be in charge of engineering and sales activities of the Alvey equipment in Northern California.

In addition to the package handling conveyors, the Alvey organization manufactures automatic pallet loaders, depalletizers, vertical lifts, patented truck loading and unloading conveyors and various other material handling equipment.

Dow Laboratory Buildings Underway at Walnut Creek

PITTSBURG, CALIF.—The Dow Chemical Co. began construction last month on the first major laboratory building at its research site on Oak Grove Rd. in Walnut Creek, Calif.

Leland A. Doan, general manager of Dow's Western Div., said construction is scheduled for completion about June 1, 1962.

The installation will consist of a laboratory building and a separate administrative building. These facilities will be occupied at first by 55 scientists and technicians who will be transferred from Dow's research department at Pittsburg, Calif.

The research facilities will be devoted to the laboratory exploration of new chemical compounds and processes.

New Factories, Expansions Report for No. California

SAN FRANCISCO — More than $110,000,000 was committed in northern California's 48 counties for 449 industrial projects during the first five months of this year, according to the San Francisco Chamber of Commerce Industrial department.

Most of that sum, or $91,578,900, was committed for 325 expansions with the remainder, or $18,692,500 for 124 new factories.

Out of the cumulative total, more than $95 million was committed in the San Francisco Bay Region's 13 counties. San Francisco's share was $2,230,700 for 56 expansions and $515,500 for 25 new plants.

Colorado, Portland Reps Named by Allis-Chalmers

COLORADO SPRINGS, COLO. — Two new Western distributors have been named for Allis-Chalmers Industries Group products.

They are the General Pump Co., 118 South Nevada Ave., Colorado Springs, Colo., and the Reed Electric Sales & Supply Co., 2539 N. W. Vaughn St., Portland.

General Pump, headed by *Ruth G. Hammerling*, president, becomes a distributor for Allis-Chalmers motors and pumps in 29 Colorado counties.

Reed Electric Sales & Supply, under the leadership of *J. C. Reed*, will distribute Allis-Chalmers motors, control and transformers in the entire area covered by the company's Portland district office.

$3,000,000 Plywood Plant Underway at Helena, Mont.

HELENA, MONT.—A $3,000,000 plywood plant, which will employ at least 100 men, has been started at Libby, according to *Henry Wegner*, executive vice president of the St. Regis Paper Co., who will supervise the construction job.

The 220,000 sq. ft. facility will be located just north of the company's present sawmill in Libby. The plant will produce some five million square feet of plywood per month on a ⅜-inch basis of which about 70% will be sheeting and 30% will be finished plywood.

Both larch and fir timber will be utilized by the plant.

Classified Section

Space is sold as advertisers' inches. All advertisements in this section are ⅛ inch short of contracted space to allow for borders and composition. Rates are $16.00 a column inch. Copy should be sent in by the 20th of preceding month if proofs are required; by the 25th if no proofs are required.

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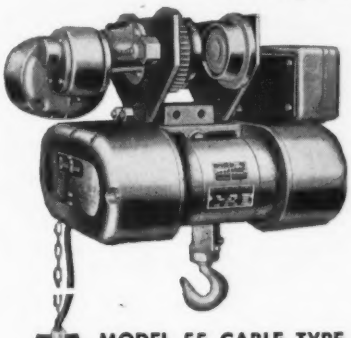

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Kilsby-Tubesupply

Dr. H. G. Romig
Leach Corp.

D. A. Linn
U. S. Steel

E. W. Bullard
Bullard Co.

■ *William P. James* has joined Centrifugal Casting Co., Long Beach, Calif., as a metallurgical engineer.

■ *Dr. William F. Ballhaus* is newly appointed executive vice president, Northrop Corp., Beverly Hills, Calif.

■ *James Kyffin* is newly appointed vice president, manufacturing, C. A. Norgren Co., Englewood, Colo.

■ *Frederick C. Broadway* has been appointed traffic manager and *Roy A. Anderson* assistant traffic manager, Colorado Fuel and Iron Corp.'s, Colorado Div., Denver.

■ *Walter G. Hargesheimer* has been named general manager, Kilsby-Tubesupply, Los Angeles and *Robert K. Hughes,* manager of company's Northwestern operations at Seattle.

■ *Dr. Harry G. Romig* has been named corporate director of quality engineering, Leach Corp., Los Angeles, with emphasis on Relay Div. activities.

■ *Donald A. Linn* has been named division supervisor — safety for the Western Steel Div., U. S. Steel Corp., Los Angeles.

■ *E. W. Bullard* is newly elected president of the Industrial Safety Equipment Association. He is president of E. W. Bullard Co., Sausalito, Calif.

■ *Leland A. Kelson* has been appointed resident manager, Lebanon, Ore. mill div.; and *Clarence E. Englund,* assistant resident manager, West Linn, Ore. mill div., Crown Zellerbach Corp.

■ *John A. Manders* is newly appointed vice president, manufacturing, Burgmaster Corp., Los Angeles.

■ *Stanley W. Nightingale* has been appointed to the new post of general manager, Steel Structures Div., Soule Steel Co., San Francisco.

■ *Dr. S. Dean Wanlass* has joined Packard Bell Electronics, Los Angeles, as vice president, Defense and Industrial Group.

■ *Gary Himler* has been named director of engineering, Computer Measurements Co., San Fernando, Calif.

■ *Jack R. Fitzwater* has been appointed to the newly-created position of traffic manager, Eitel-McCullough, Inc., San Carlos, Calif.

■ *J. T. Higgins* has been appointed vice president, director and chief functional officer in charge of manufacturing, engineering and research, Standard Oil Co. of Calif.

■ *Philip S. Hill* has been named president of Hyster Co. *Ernest G. Swigert,* who has been president, has been named chairman of the board.

■ *Rollin M. Russell* has been elected president, Acoustica Associates, Inc., Los Angeles.

■ *Henry T. Swigert* has been appointed vice president—finance, Esco Corp., Portland.

■ *Robert Murie* has joined Dalmo Victor Co., Div. of Textron, Inc., Belmont, Calif., as chief engineer.

■ *Norman Weinhouse* has been named chief engineer, Kearfott Microwave Div., General Precision, Van Nuys, Calif.

■ *Elmer W. Torok* has joined International Rectifier Corp., El Segundo, Calif., as development manager, microcricuitry.

■ *Hsiung Wei Li* has been named chief metallurgist for MK Diamond products, Musto-Keenan Co., Los Angeles.

■ *Daniel E. Murphy* was recently named assistant to the president, Consolidated Electronics Corp., Pasadena, Calif.

■ *A. D. Bullock* has been named service manager, Kenworth Motor Truck Co., Seattle.

■ *E. C. Stork* has been appointed vice president and general manager, Colorado Research Corp., Broomfield, Colo.

■ *Al W. Mills* has been appointed program manager for the Dyna-Soar project being carried out by Sunstrand Aviation, Denver.

■ *William A. Sipprell* has joined Guidance Technology, Inc., Santa Monica, Calif., as vice president.

■ *Dale E. St. John* has been elevated to director of advanced development, communications and data systems, Arnoux Corp., Los Angeles.

■ *W. L. Batty, Jr.* has been promoted to manager, Western district, Silicone Products Dept., General Electric Co., with offices at Downey, Calif.

■ *Charles H. Jackson* has joined Hi-Shear Corp., Torrance, Calif., as staff engineer, Ordnance Products and Systems.

■ *Dr. Lester C. Van Atta* has been appointed technical director, Hughes Aircraft Co.'s research laboratories at Malibu, Calif.

■ *Jack W. Blanchard* has been named chief engineer, Phoenix Electronics Plant of Kaiser Aircraft & Electronics Div., Kaiser Industries Corp.

■ *Arthur C. Geldner* has been named assistant general sales manager, Pacific Tube Co., Los Angeles.

■ *Crichton C. Callaway, Jr.* has joined the firm of Charles Luckman Associates, Los Angeles, as vice president in charge of Office Building Div.

■ *Edward E. Tschantz* has been appointed chief engineer, Fastener Div., United Shoe Machinery Corp., Shelton, Conn. He was formerly associated with Lockheed at Burbank, Calif.

■ *Mark E. Spinney* has been named a field representative for International B. F. Goodrich Co., Anchorage, Alaska.

■ *Eugene Fioramonti* has been elected vice president of Powertron Pacific Corp., Los Angeles.

■ *Richard J. Grant, Mahud Zareh-Farzian, Paul Korda and Werner Hohenstein* have joined the engineering staff of Lenkurk Electric Co., San Carlos, Calif.

■ *Sheridan G. Stanton* is newly appointed staff designer, architectural products, for Gladding, McBean & Co., Los Angeles.

■ *Lee N. Mortenson* has been appointed manager, Research and Analysis Dept., Wyle Laboratories, El Segundo, Calif.

■ *Arne Schleimann-Jensen* is newly named manager of product engineering, Microwave Device Operations plant, Sylvania Products, Inc., Mountain View, Calif.

■ *Donald P. Allen* has been promoted to manager, Products Dept., Tape Unit Div., Ampex Computer Products Co., Culver City, Calif.

■ *Robert W. Titgemeyer* and *Kenneth C. Largent* have been named district managers, Los Angeles and San Francisco areas, respectively, for Carpenter Steel Co.

■ *Claude Kinchen* has been appointed supervisor, product development and cost analysis for millwork, International Paper Co.'s Long-Bell Div., Weed, Calif.

■ *John F. Brow* has been named general manager, Pacific Coast Industrial Equipment Corp., El Monte, Calif.

■ *Elmer P. Wheaton* has been promoted to acting vice president, engineering, Douglas Aircraft Co., Santa Monica, Calif., replacing *Edward F. Burton,* who is on extended leave due to illness.

■ *Dr. Arnold T. Nordsieck* has been appointed to head Technical Specialties Dept., General Motors Defense Systems Div., Santa Barbara, Calif.

■ *Edgar J. Tillman* has been appointed director of manufacturing, U. S. Science Corp., Los Angeles.

■ *E. M. Pritchett* is newly named manager of the Honolulu base of Lockheed Aircraft Service, Inc.

■ *John P. Moffat, Jr.* has been appointed manager, product development, Transducer Div., Consolidated Electrodynamics Corp., Monrovia, Calif.

■ *C. L. Anderson,* after nearly 40 years in the lumber business, has retired as general manager, Vernonia, Wash., branch of International Paper Co.'s Long-Bell Div.

■ *Henry Moore* has joined West End Chemical Co., Div. Stauffer Chemical Co., San Francisco, as glass technologist and glass furnace engineer.

■ *Albert J. Bradfield* has been named general foreman of assigned maintenance, Colorado Fuel and Iron Corp.'s Pueblo plant.

■ *Karl Giesler* has joined Industrial Tectonics, Inc., Los Angeles, as assistant manager for special products.

■ *A. J. Daley* has been appointed northwest regional manager, Weyerhaeuser Co.'s wood products div., Tacoma, Wash.

■ *Walter Buckow* who retired in April as president of Anchorage Oxygen Co., Anchorage, died in Santa Barbara, Calif. Aug. 6.

■ *C. Allan MacPhee* has been promoted to mechanical maintenance superintendent, Reynolds Metals Co.'s Longview, Wash. aluminum reduction plant.

■ *Philip M. Prophett* has been named manager of base activation at General Dynamics-Astronautics, San Diego, Calif.

■ *Glenn T. Bovee* is newly appointed vice president and treasurer of PM Electronics, Inc., San Diego, Calif.

■ *Thomas E. Morris* has been elected financial vice president and treasurer, Iron Fireman Mfg. Co., Portland.

■ *George M. Leitch* has joined Areonutronic Div., Ford Motor Co., Newport Beach, Calif., as a special assistant in Electronics Operations.

■ *Fred C. Mehner* has been appointed general manager of Houston Fearless Corp.'s newly designated Pacific Div., Torrance, Calif.

■ *Louis H. Wilson* has been named manager, Western region, RCA's Defense Electronics Products, Los Angeles.

■ *Harry Otis* is newly appointed northwest district sales manager for Clark Equipment Co.'s Industrial Truck Div. with headquarters at Portland.

■ *Sam L. Todd* has been named secretary-treasurer of American Orbitronics Corp., Hawthorne, Calif., and Washington, D. C.

ADVERTISERS INDEX

A

Acme Chain Corporation 83
Air Reduction Pacific Company, A Division of Air Reduction Company, Inc. ..... 36 & 37
Alan Wood Steel Company 5
Allied Supply Company 16
Allis, Louis, Company, The 12
American Chain Division American Chain & Cable Company, Inc. 73
American Floor Machine Co., Division of American Lincoln Corporation ..... —
American-Lincoln Corporation ..... —
Ampco Metal, Inc. 19
Anaconda American Brass Company ..... —
Anaconda Wire & Cable Company 40
Anchor Post Products, Inc. (Fence Div.) ..... —
Armco Drainage & Metal Products, Inc. 39
Arrow Freight Forwarders 86
ASCO Sintering Corporation ..... —
Automatic Transportation Company Division of Yale & Towne Mfg. Company 15
Azon West Coast Corp. 79

B

Babbitt Steam Specialty Co. ..... —
Baker Industrial Trucks 3
Baker Tube Company 13
Bay State Abrasive Products Co. ..... —
Boston Gear Works 62
Buell Engineering Company 22

C

Campbell Chain Company 78
Centrifugal Casting Company 81
Cherry Rivet Division Townsend Company 82
Chisholm-Moore Hoist Division Columbus-McKinnon Corporation 86
Clark Controller Company 10
Clements Manufacturing Co. ..... —
Cleveland Tramrail Division The Cleveland Crane & Engineering Co. ..... 55 & 56
Cleveland Vibrator Co., The ..... —
Coast Industrial Supply Co., Inc. ..... —
Coldwell, Banker & Co. 69
Colorado Fuel & Iron Corporation, The 11
Colson Equipment & Supply Co. ..... —
Columbia Geneva Steel Division United States Steel Corporation 7
Columbus McKinnon Corporation ..... —
Compressor Service Company 95S
Crocket Mfg. & Engineering Corp. 93S

D

Darnell Corporation, Ltd. ..... —
Davey Compressor Company ..... —
Dempster Brothers, Inc. ..... —
Diamond Chain Company, Inc. 60
Dodge Manufacturing Corporation 6
Ducommun Metals & Supply Co. ..... Cover 3

E

Electrolift, Inc. ..... —
Esco Corporation ..... —

F

Falk Corporation, The ..... 52 & 53
Fernholtz Machinery Company 69
Fiske Brothers Refining Company Lubriplate Division 61
Flintkote Company, The, Monoform System 63
Food Machinery Corporation John Bean Division ..... —
Foucar, Ray & Simon 74

G

General Appraisal Company ..... —
General Metals Corporation Foundry & Forge Division 99
Gerbing Manufacturing Corp. 72
Glo-Quartz Electric Heater Co. 98S
Graver Tank & Mfg. Co. Division of Union Tank Car Co. ..... —
Goodall Rubber Company ..... —

H

Harnischfeger Corporation ..... 89 & 90
Haslett Field Warehousing 80
Hassall, John, Inc. 72
Haws Drinking Faucet Co. ..... —
Hough, Frank G., Co., The 101
Hub City Gear Co. ..... —
Hyster Company ..... —

J

Jeffrey Manufacturing Co., The (Ind. Div.) 18
Johnston, A. P., Co., Inc. 106
Jorgensen, Earle M., Steel Co. ..... —

K

Kellogg-American Div. (Scaife Co.) 85
Kimberly Clark Corporation 38

L

Laher Spring & Electric Car Corp. ..... —
Lake Chemical Co. ..... —
Lamson Corporation 84
Leckenoy Structural Steel Co. 7
Lifschultz Fast Freight 66
Link-Belt Company 51
Louden Machinery Company, The ..... —
Lubriplate Division, Fiske Brothers Refining Co. 61
Lyon Metal Products, Inc. ..... —

M

Mahon, R. C., Company, The ..... —
Master Fan Corp. ..... —
Mathieson, Olin, Chemical Corp. ..... —
Miller Electric Mfg. Co., Inc. ..... —
Monarch Rubber Company, The ..... —
Morris, Stanley E., Co. ..... —
Morse Manufacturing Co., Inc. ..... —
Motorola Communications & Electronics, Inc. ..... —

N

National Supply Company, The ..... Cover 2

P

Pacific Gas & Electric Company 71
Pacific Intermountain Express 88
Pacific Pumping Company 77
Pacific Telephone & Telegraph Co. 67
Pacific Tube Company ..... —
Pacific Valves, Inc. ..... —
Petley, Inc. ..... —
Powell, William, Company, The 17
Power Transmission Equipment Co. 96S

R

Republic Supply Co. ..... —
Revere Copper & Brass Inc. ..... 58 & 59
Richfield Oil Corporation ..... —
Ross, J. O., Engineering Co. ..... —
Round, David, & Son, Inc. 103
Rust-Oleum Corporation ..... 20 & 21

S

Sarco Company, Inc. ..... —
Searle Leather & Packing Co. ..... —
Security First National Bank 91S
Smoot-Holman Company ..... —
Snap-On Tools Corporation 87
Soule Steel Company ..... Cover 4
Southern California & Southern Counties Gas Companies ..... —
Standard Oil of California 9
Standard Pressed Steel Company Columbia-Hallowell Division ..... —
Industrial Fastener Division 65

T

Thermovac ..... —
Ton-Tex Corporation, Central Division 103
Towmotor Corporation ..... —
Triangle Steel & Supply 97S

U

United States Steel Corporation Columbia Geneva Steel Division 7
Universal Metal Hose Company ..... —

V

Van Huffel Tube Corp. ..... —
Victor Equipment Company ..... —

W

Wagner Electric Corporation ..... —
Washington Steel Prod. Co. 7
White Motor Company, The ..... —
Wicx-Merit Glove Company ..... —

Y

Yale & Towne Manufacturing Company Automatic Transportation Company 15

Z

Ziegler Steel Service Corp. ..... —

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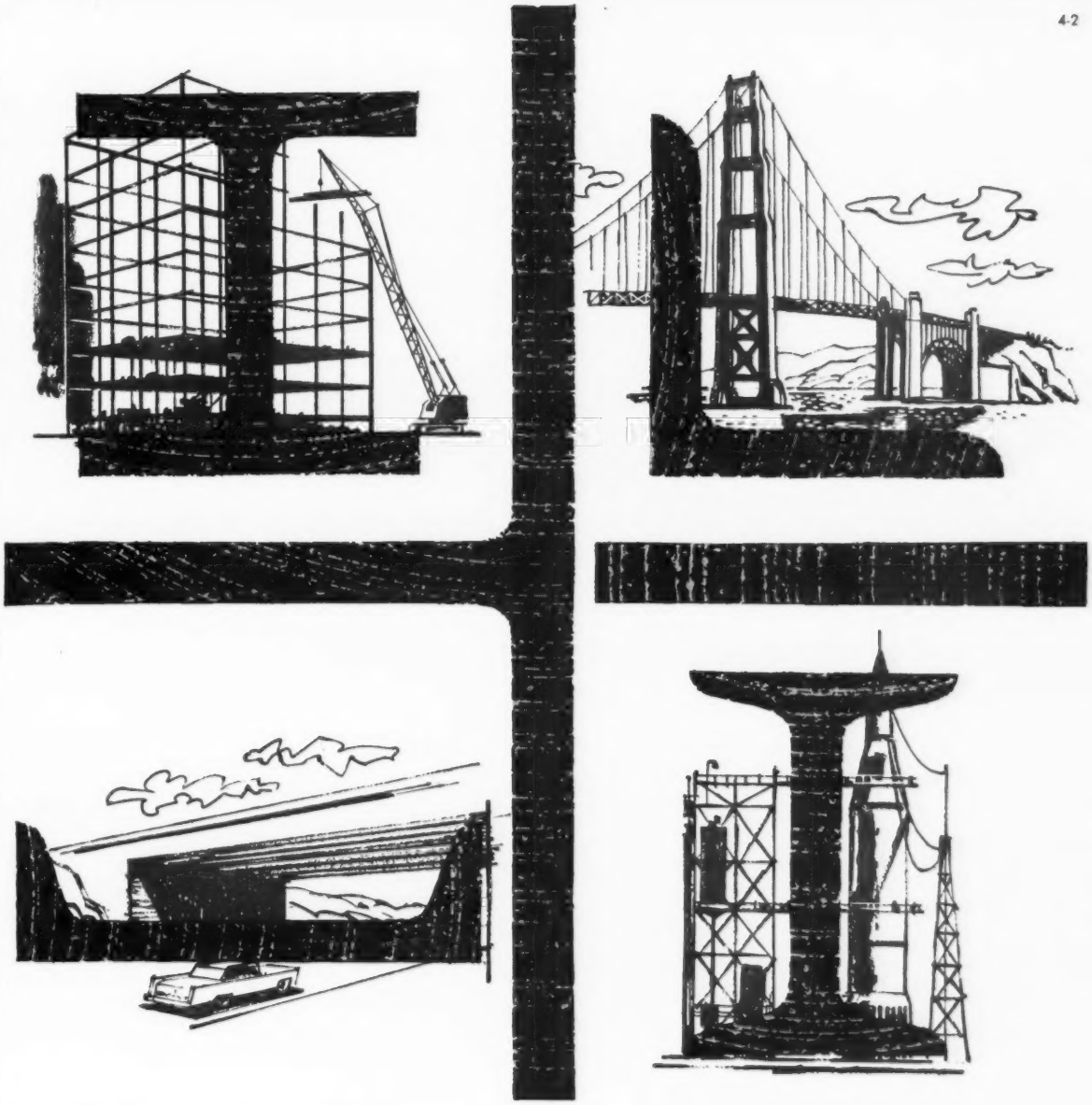

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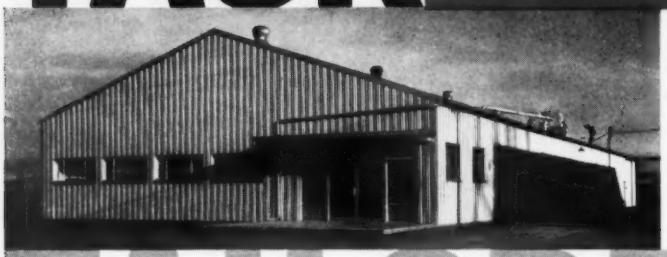

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